

**EPA Superfund
Record of Decision:**

**PRISTINE, INC.
EPA ID: OHD076773712
OU 01
READING, OH
12/31/1987**

(1) A SOURCE AND MECHANISM OF CHEMICAL RELEASE TO THE ENVIRONMENT, (2) AN ENVIRONMENTAL TRANSPORT MEDIUM FOR THE RELEASED CHEMICAL, (3) A POINT OF POTENTIAL EXPOSURE BY THE RECEPTOR WITH THE CONTAMINATED MEDIUM, AND (4) A ROUTE OF EXPOSURE. THE CURRENT USE POTENTIAL EXPOSURE PATHWAYS INCLUDED DERMAL CONTACT AND INCIDENTAL INGESTION OF THE SOIL, INGESTION OF THE GROUNDWATER CONTRIBUTION FROM PRISTINE, INC. TO THE READING WATER SUPPLY WELLS SOMETIME IN THE FUTURE, AND INHALATION OF DUST AND OF VOLATILE CHEMICALS EMITTED FROM SOILS AND SURFACE WATER. ALTHOUGH GROUNDWATER CONTAMINATION IS PRESENTLY MIGRATING FROM THE SITE, THE MAGNITUDE AND EXTENT OF OFFSITE CONTAMINATION FROM THE SITE HAS NOT BEEN DETERMINED. THEREFORE, ASSUMPTIONS WERE MADE REGARDING THE MIGRATION. INCLUDED IN THE GROUNDWATER EXPOSURE PATHWAY WAS CONSIDERATION OF FUTURE CONTAMINANT MIGRATION FROM THE SITE. THE POTENTIAL PATHWAYS CONSIDERED IF THE SITE WAS REUSED WERE EXPOSURE VIA INGESTION OF GROUNDWATER ON THE SITE AND DERMAL CONTACT AND INCIDENTAL INGESTION OF WATER IN MILL CREEK THAT HAD BEEN CONTAMINATED BY STORM WATER RUNOFF. TABLE 3 SUMMARIZES THE EXPOSURE PATHWAYS CONSIDERED IN THE PHE. ALSO INCLUDED IN THE TABLE ARE POTENTIALLY EXPOSED POPULATIONS, FACTORS AFFECTING EXPOSURE, AND THE LIKELIHOOD EXPOSURE COULD OCCUR.

THE EXCESS LIFETIME CANCER RISK LEVEL FOR EACH COMPLETE EXPOSURE PATHWAY IS LISTED IN TABLE 4. CURRENT CONDITIONS AT THE SITE POSE A RELATIVELY LOW HAZARD VIA THE INHALATION ROUTE. CONTACT WITH THE CONTAMINATED SOIL CONSTITUTES A HAZARD ASSUMING THE LENGTH OF EXPOSURE IS ON THE ORDER OF SEVERAL YEARS AND OCCURS FOR SEVERAL HOURS A DAY DURING GOOD WEATHER AS APPEARS LIKELY AT THIS SITE UNDER CURRENT USE CONDITIONS. INGESTION OF GROUNDWATER APPEARS TO BE THE EXPOSURE PATHWAY THAT POSES THE GREATEST RISK IN THAT (1) GROUNDWATER CONTAMINATION IS CONSIDERED LIKELY TO OCCUR AT THE READING WELLFIELD IN THE FUTURE IF CURRENT PUMPING RATES AT THIS WELLFIELD REMAIN CONSTANT AND (2) GROUNDWATER AT THE SITE WOULD POSE RISKS TO FUTURE POTENTIAL USERS.

FOR COMPLETE DETAILS, CHAPTER 5 OF THE REMEDIAL INVESTIGATION SHOULD BE CONSULTED (JULY 1986, CAMP, DRESSER AND MCKEE, INC.).

#CR

COMMUNITY RELATIONS

DURING THE ACTIVE LIFE OF THE FACILITY, NUMEROUS COMPLAINTS WERE MADE BY RESIDENTS LIVING IN AN ADJACENT TRAILER PARK AND BY NEARBY INDUSTRY REGARDING SMOKE, ODORS AND GENERAL DISSATISFACTION WITH THE INCINERATOR OPERATION. NO LOCAL CITIZEN GROUP HAS BEEN FORMED AND THERE HAS BEEN LITTLE CITIZEN ACTIVITY OR INTEREST SINCE THE FACILITY CLOSED.

A PUBLIC MEETING WAS HELD TO KICK OFF THE RI/FS. BECAUSE THE DEGREE OF PUBLIC INTEREST IN THIS SITE APPEARED TO BE LOW, U.S. EPA DECIDED THAT THERE WAS NO NEED FOR A MEETING FOLLOWING THE RI. U.S. EPA MET WITH THE CITY OFFICIALS TO BRIEF THEM ON THE RESULTS OF THE RI AND FACT SHEETS WERE MAILED TO ALL ON THE MAILING LIST.

A PUBLIC MEETING WAS HELD ON DECEMBER 3, 1987 TO DISCUSS THE PUBLIC COMMENT DRAFT FS. THE PUBLIC COMMENT PERIOD WAS ORIGINALLY ESTABLISHED BETWEEN NOVEMBER 13 AND DECEMBER 4, 1987. ON NOVEMBER 24, 1987, U.S. EPA, IN RESPONSE TO A REQUEST BY PRPS, EXTENDED THE PUBLIC COMMENT PERIOD TO DECEMBER 11, 1987. THE ATTACHED RESPONSIVENESS SUMMARY ADDRESSES SPECIFIC QUESTIONS AND COMMENTS RAISED AT THE DECEMBER 3, 1987 MEETING AND DURING THE PUBLIC COMMENT PERIOD.

#ENF

ENFORCEMENT

U.S. EPA HAS IDENTIFIED APPROXIMATELY 150 PRPS FOR THE PRISTINE, INC. SITE. U.S. EPA IDENTIFIED THE PRPS ON THE BASIS OF PRISTINE, INC. RECORDS, GOVERNMENTAL RECORDS, AND RESPONSES TO INFORMATION REQUESTS SUBMITTED PURSUANT TO SECTION 104(E) OF CERCLA.

CERCLA SECTION 104(E) INFORMATION REQUESTS WERE SENT TO ALL KNOWN PRPS IN 1985 AND 1986. U.S. EPA HAS COMPILED THE SITE RECORDS AND INFORMATION REQUEST RESPONSES INTO A TRANSACTIONAL DATA BASE (TDB).

ALSO, U.S. EPA COMPILED A VOLUMETRIC RANKING OF PRPS BASED ON THE TDB, AND SENT THE RANKING TO THE PRPS IN NOVEMBER 1987.

A PRP STEERING COMMITTEE WAS ESTABLISHED IN MARCH 1987. THE STEERING COMMITTEE AND IS VERY ACTIVE IN THE ENFORCEMENT PROCESS. U.S. EPA HAS HELD EXTENSIVE DISCUSSIONS WITH THE PRP STEERING COMMITTEE AND HAS PROVIDED THEM WITH THE TDB AND OTHER TECHNICAL INFORMATION AS REQUESTED.

ON NOVEMBER 23, 1987, SPECIAL NOTICE LETTERS PURSUANT TO SECTION 122(E) OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) OF 1986 WERE SENT TO ALL PRPS. THE DEADLINE FOR RECEIPT OF A "GOOD FAITH OFFER" TO CONDUCT THE REMEDIAL DESIGN AND REMEDIAL ACTION IS JANUARY 27, 1988. U.S. EPA IS CURRENTLY NEGOTIATING WITH THE PRPS, GIVING THEM THE OPPORTUNITY TO CONDUCT THE REMEDIAL DESIGN AND REMEDIAL ACTION DISCUSSED IN THIS SUMMARY OF REMEDIAL ALTERNATIVE SELECTION AND THE RECORD OF DECISION.

#AE

ALTERNATIVES DEVELOPMENT

REMEDIAL ACTION GOALS

IN EVALUATING THE FINDINGS OF THE RI AND PHE, U.S. EPA DEVELOPED AND ANALYZED ALTERNATIVES IN A MANNER CONSISTENT WITH NCP. REMEDIAL ACTION GOALS WERE DEVELOPED BASED ON THE RESULTS OF THE RI AND PHE. THE GENERAL GOAL FOR ALL ENVIRONMENTAL MEDIA (SOIL, GROUNDWATER, AND SURFACE WATER) IS TO PROVIDE ADEQUATE PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT FROM INHALATION, ADSORPTION, AND INGESTION OF HAZARDOUS SUBSTANCES. AS MORE INFORMATION WAS OBTAINED, THESE REMEDIAL ACTION GOALS WERE REFINED AND MORE SPECIFICALLY DEFINED FOR EACH ENVIRONMENTAL MEDIUM.

REMEDIAL RESPONSE ACTIONS/TECHNOLOGIES

ONCE THE REMEDIAL ACTION GOALS WERE DEVELOPED, GENERAL REMEDIAL RESPONSE ACTIONS, INTENDED TO MEET THE REMEDIAL ACTION GOALS AND ADDRESS THE SITE-SPECIFIC CHARACTERISTICS OF THE CONTAMINATED MEDIA, WERE DEVELOPED. THEN, A COMPLETE ARRAY OF TECHNOLOGIES WAS IDENTIFIED AND SCREENED TO PRODUCE A CONDENSED LIST OF APPLICABLE REMEDIAL TECHNOLOGIES THAT MAY BE SUITABLE FOR THE CONTROL OF THE CONTAMINATED MEDIA AT THE PRISTINE, INC. SITE.

ASSEMBLY AND INITIAL SCREENING OF ALTERNATIVES

ALL APPLICABLE REMEDIAL TECHNOLOGIES WERE ASSEMBLED INTO ALTERNATIVES TO ADDRESS THE OVERALL CONTAMINATION AT THE SITE. THERE WERE 64 SUCH ALTERNATIVES. THESE WERE SUBJECTED TO AN INITIAL SCREENING TO REDUCE THE LIST OF POTENTIAL REMEDIAL ACTION ALTERNATIVES FOR DETAILED ANALYSIS. THE CRITERIA USED TO SCREEN THESE ASSEMBLED ALTERNATIVES WERE EFFECTIVENESS, IMPLEMENTABILITY, AND COST. ALTERNATIVE COMPONENTS THAT WERE ELIMINATED AS A RESULT OF THIS SCREENING PROCESS INCLUDE OFF-SITE INCINERATION, GROUNDWATER TREATMENT AT A RCRA OR POTW FACILITY, AND OFF-SITE RCRA DISPOSAL OF CONTAMINATED STRUCTURES. THE ALTERNATIVE COMPONENTS THAT WERE CARRIED THROUGH TO DETAILED ANALYSIS INCLUDE:

REMEDIATION OF SOILS -

- DISPOSAL OF SOILS IN OFF-SITE RCRA LAND DISPOSAL FACILITY;
- INCINERATION OF SOILS;
- VITRIFICATION OF SOILS;
- DISPOSAL OF SOILS IN AN ONSITE RCRA LANDFILL;

REMEDIATION OF GROUNDWATER -

- EXTRACTION AND ONSITE TREATMENT OF GROUNDWATER;

REMEDIATION OF EXISTING STRUCTURES -

- DECONTAMINATION AND DISPOSAL OF STRUCTURES IN AN OFFSITE SOLID WASTE LANDFILL.

- DEMOLITION AND DISPOSAL OF STRUCTURES ONSITE.

THESE SEVEN COMPONENTS MADE UP THE ALTERNATIVE ARRAY THAT WAS FURTHER DEVELOPED DURING THE DETAILED ANALYSIS.

DETAILED DESCRIPTION OF ASSEMBLED ALTERNATIVES

PRIOR TO THE DESCRIPTION OF THE ASSEMBLED ALTERNATIVES, THE BASIS FOR THE REMEDIATION OF CONTAMINATED MEDIA WILL BE DISCUSSED. THIS INCLUDES: QUANTITIES OF SOIL TO BE REMEDIATED, THE VOLUME OF GROUNDWATER TO BE EXTRACTED, THE EXTRACTION METHODS TO BE USED, AND TIME TO IMPLEMENT THE CLEANUP OF THE GROUNDWATER.

SOIL ANALYSIS

THE SOIL ANALYSIS ASSESSED THE VERTICAL AND HORIZONTAL DISTRIBUTION OF SOIL CONTAMINANTS AND THE RELATIVE RISK ASSOCIATED WITH THE CONTAMINANTS. THE SOIL ANALYSIS, USING THE INFORMATION PRODUCED IN THE PHE, DETERMINED THE METHODS USED TO DERIVE TARGET SOIL CONCENTRATIONS ASSOCIATED WITH A TARGET RISK DUE TO DIRECT CONTACT AND THE ACCEPTABLE RESIDUAL LEVELS OF CHEMICALS IN THE SOILS.

THE RI REVEALED THAT A LARGE NUMBER OF CONTAMINANTS WERE PRESENT IN THE SURFACE SOILS, TRENCHES, AND SOIL BORINGS. AS PART OF THE PHE, A SUBSET OF THESE CHEMICALS (INDICATOR CHEMICALS) WERE SELECTED TO EVALUATE THE POTENTIAL RISKS TO HUMAN HEALTH FROM THE PRISTINE, INC. SITE. THE SUPERFUND PUBLIC HEALTH EVALUATION MANUAL (EPA 1986) RECOMMENDS THE RE-EVALUATION OF THE INDICATOR CHEMICALS FOR THE FS TO ENSURE THAT ALL CLASSES OF CHEMICALS ARE CONSIDERED AND CAN THEREFORE BE EVALUATED AS TO THE APPLICABILITY OF THE REMEDIAL OPTIONS CONSIDERED. ADDITIONALLY, THE MANUAL ADVISES THAT THE INITIAL FOCUS OF THE EVALUATION BE ON THE POTENTIAL CARCINOGENS SINCE THEY WILL GENERALLY DRIVE THE FINAL DESIGN.

IN THIS CASE, 11 COMPOUNDS WERE CHOSEN BASED ON FREQUENCY, CONCENTRATION AND POTENTIAL THREAT. THE 11 COMPOUNDS WERE ALDRIN, BENZENE, CHLOROFORM, DDT, 1,2-DICHLOROETHANE, 1,1-DICHLOROETHENE, DIELDRIN, PAHS, 2,3,7,8-TCDD (DIOXIN), TETRACHLOROETHENE, AND TRICHLOROETHENE.

BASED ON THESE 11 COMPOUNDS, AND A CUMULATIVE TARGET RISK LEVEL OF 10^{-6} , THE RESULTING APPORTIONED (INDIVIDUAL) TARGET RISK LEVEL OF 9.1×10^{-8} FOR EACH POTENTIAL CARCINOGEN WAS CALCULATED. ONCE THE TARGET INTAKE WAS CALCULATED, THE CORRESPONDING INDIVIDUAL INTAKE CONCENTRATION COULD BE CALCULATED USING THE FOLLOWING FORMULA:

POTENTIAL CARCINOGENIC RISK = (CHRONIC DAILY INTAKE) (POTENCY FACTOR).

THE RISK WAS BASED ON EXPOSURE TO CONTAMINATED SOIL BY DIRECT CONTACT AND INCIDENTAL INGESTION. TABLE 5 PRESENTS THE CHRONIC DAILY INTAKE FOR EACH OF THE COMPOUNDS OF CONCERN.

A REMEDIATION STRATEGY WAS DEVELOPED TO REMEDIATE ALL SOILS WHICH CONTRIBUTED TO A 10^{-6} CANCER RISK BASED ON THE CALCULATED DAILY INTAKE. IT WAS DETERMINED THAT, TO REDUCE THE RISK ASSOCIATED WITH A 10^{-6} TARGET CLEANUP LEVEL BASED ON DIRECT CONTACT AND INCIDENTAL INGESTION ONLY, IT WILL BE NECESSARY TO REMEDIATE 7,125 CUBIC YARDS OF SOIL AT THE SITE. (THE FS USED THE VOLUME 8,225 CUBIC YARDS OF SOIL. AFTER PUBLICATION OF THE FS, THE VOLUME WAS RECALCULATED. THIS CHANGE SHOULD NOT SIGNIFICANTLY AFFECT THE COST AND WILL NOT AFFECT THE COMPARATIVE ANALYSIS SINCE ALL ALTERNATIVES HAVE BEEN MADE CONSISTENT WITH THIS NEW VOLUME.). CONCENTRATIONS OF ALDRIN, BENZENE, DDT, 1,2-DICHLOROETHANE, DIELDRIN, TETRACHLOROETHENE AND PAH ARE GREATER THAN THE TARGET RISK CONCENTRATIONS LISTED IN TABLE 5. DIELDRIN, DDT, AND BENZENE, DOMINATE SOIL REMEDIATION STRATEGY. REMOVAL OF 1 FOOT OF SOIL OVER THE AREA OF THE SITE WILL ELIMINATE THE RISK ASSOCIATED WITH DIRECT CONTACT AND INCIDENTAL INGESTION OF DIELDRIN, DDT, 1,2-DICHLOROETHANE, TETRACHLOROETHYLENE, ALDRIN AND PAHS. THIS REPRESENTS A VOLUME OF 3,598 CUBIC YARDS OF SOIL. THE AREA TO A DEPTH OF TWO FEET AS SHOWN IN FIGURE 6 SHOWS THE AREA THAT NEEDS TO BE REMEDIATED BASED ON INGESTION OF BENZENE. THIS REPRESENTS A VOLUME OF 1,799 CUBIC YARDS. SEDIMENT SAMPLES ARE DEFINED AS CONTAMINATED MEDIA BASED ON CONCENTRATIONS OF ALDRIN, DDT, DIELDRIN, PAHS, AND 1,2-DICHLOROETHANE. THE VOLUME OF CONTAMINATED SEDIMENTS IS ESTIMATED TO BE 600 CUBIC YARDS. SUBSURFACE SOIL AT THE MAGIC PIT AREA ARE ALSO DEFINED AS CONTAMINATED BASED ON THE CONCENTRATION OF 1,2-DICHLOROETHANE. THE VOLUME OF SOIL REMEDIATION NECESSARY AT THE MAGIC PIT IS CALCULATED TO BE APPROXIMATELY 1,125 CUBIC YARDS. REMEDIATION STRATEGY I INCLUDES A COMBINED VOLUME OF 7,125 CUBIC YARDS OF CONTAMINATED MEDIA. THIS SOIL REMOVAL (7,125 CUBIC YARDS) STRATEGY ADDRESSES ONLY THE DIRECT

CONTACT THREAT. SOIL CONTAMINATION REMAINS AT THE SITE AT DEPTH. WASTES CAN POTENTIALLY LEACH FROM THE SOIL AND MIGRATE DOWNWARD THROUGH THE MIDDLE AND LOWER LENSES, AND INTO THE LOWER AQUIFER.

A SECOND SOIL REMOVAL STRATEGY WAS DEVELOPED WHICH WOULD ELIMINATE BOTH THE RISK ASSOCIATED WITH ADSORPTION AND INGESTION OF SOILS AND INGESTION OF GROUNDWATER CONTAMINATED THROUGH LEACHING FROM THE SOIL. THIS SECOND STRATEGY WAS DEVELOPED AS AN ALTERNATIVE SUCH THAT THE RESIDUALS WOULD POSE NO DIRECT CONTACT THREAT NOR WOULD THE RESIDUALS IMPACT THE GROUNDWATER. THIS STRATEGY WAS ALSO DEVELOPED TO MEET THE INTENT OF THE LAND DISPOSAL RESTRICTIONS AND CLEANUP STANDARDS.

RESIDUAL CONTAMINATION REMAINING IN THE SOIL WILL, OVER TIME, LEACH INTO THE GROUNDWATER. A MODEL WAS DEVELOPED TO PREDICT CONTAMINANT CONCENTRATIONS IN GROUNDWATER AT THE PRISTINE, INC. SITE THROUGH LEACHATE PRODUCED FROM THE RESIDUAL SOIL CONTAMINATION. THIS MODEL IS CONSERVATIVE IN THAT IT ASSUMES THAT ALL OF THE CONTAMINATION REACHES THE LOWER AQUIFER AND IS ONLY DILUTED WITH INFILTRATING RAINWATER.

THE MODEL ASSUMES THAT 15 PERCENT OF THE RAINFALL AT THE SITE WILL INFILTRATE THE SITE AND ABSORB CONTAMINANTS FROM THE SOIL BASED ON EQUILIBRIUM SOIL-WATER PARTITIONING. THE INFILTRATING RAINWATER WILL ACT TO DILUTE AND TRANSPORT THE MOBILIZED CONTAMINANT. THE MODEL ASSUMES AN EQUILIBRIUM PARTITIONING OF THE CONTAMINANT BETWEEN THE SOIL AND THE SOIL PORE WATER. THE MODEL DOES NOT ACCOUNT FOR ATTENUATION OF THE CONTAMINANTS IN THE UNSATURATED ZONE. IT FURTHER ASSUMES THAT ALL OF THE CONTAMINATION REACHES THE LOWER AQUIFER. SINCE THE UPPER AND LOWER AQUIFER ARE CONNECTED, THIS ASSUMPTION IS REALISTIC. ONCE THE INFILTRATING WATER REACHES THE LOWER AQUIFER, IT IS FURTHER ASSUMED THAT IT WILL MIX COMPLETELY WITH THE GROUNDWATER BELOW THE SITE, RESULTING IN AN EQUILIBRIUM GROUNDWATER CONCENTRATION.

THE GROUNDWATER CONCENTRATIONS, CAUSED BY LEACHING FROM THE SOIL, PREDICTED TO OCCUR AT THE WELLFIELD EXCEEDED MAXIMUM CONTAMINANT LEVELS (MCLS) FOR BENZENE, 1,2-DICHLOROETHANE, AND TRICHLOROETHENE. MCLS ARE DISCUSSED IN DETAIL IN THE SECTION ON CONSISTENCY WITH OTHER LAWS. THE 10-6 EXCESS LIFETIME CANCER RISK WAS ALSO EXCEEDED FOR OTHER COMPOUNDS. THE PREDICTED CONCENTRATIONS AT THE WELLFIELD WERE 17 UG/L OF BENZENE, 56 UG/L FOR 1,2-DICHLOROETHANE, AND 5 UG/L FOR TRICHLOROETHENE. AT THE SITE BOUNDARY THESE PREDICTED CONCENTRATIONS WERE 140 UG/L, 470 UG/L AND 430 UG/L, RESPECTIVELY.

TO ELIMINATE THIS RISK TO GROUNDWATER, A REVERSE CALCULATION WAS USED TO CALCULATE THE CONCENTRATION OF BENZENE, 1,2-DICHLOROETHANE, AND TRICHLOROETHENE THAT COULD REMAIN IN THE SOILS AND NOT POSE A THREAT DUE TO LEACHING. THIS STRATEGY INDICATES THAT 37,700 CUBIC YARDS OF SOIL MUST BE REMEDIATED. CONCENTRATIONS IN THE SOIL OF BENZENE AND 1,2-DICHLOROETHANE EXCEED THEIR RESPECTIVE TARGET CONCENTRATIONS LISTED IN TABLE 7. BASED ON THE CONCENTRATION OF CONTAMINANTS AND THE EXTENT OF CONTAMINATION, (8 FEET ACROSS THE ENTIRE SITE, 12 FEET ACROSS 50 PERCENT OF THE SITE), THE RECOMMENDED VOLUME OF SOIL FOR REMEDIATION TO AN AVERAGE DEPTH OF 10 FEET IS 35,980 CUBIC YARDS. FIGURE 7 PRESENTS THE AREA OF SOIL REMEDIATION DEFINED BY STRATEGY II. THE VOLUME OF CONTAMINATED SEDIMENTS (600 CUBIC YARDS) AND SUBSURFACE SOILS AT THE MAGIC PIT (1,125 CUBIC YARDS) SHOULD ALSO BE INCLUDED. THEREFORE, THE VOLUME OF SOIL TO BE REMEDIATED IS 37,700 CUBIC YARDS. (THE FS USED THE VOLUME 36,600 CUBIC YARDS.). A RECALCULATION OF THE VOLUMES WAS PERFORMED AND THE TOTAL VOLUME IS 37,700 CUBIC YARDS. THIS WILL NOT SIGNIFICANTLY AFFECT THE COSTS NOR WILL IT AFFECT THE ALTERNATIVE EVALUATION SINCE THEY ARE ALL CONSISTENT.).

TO SUMMARIZE, CONTAMINATED SOIL POSES A THREAT TO HUMAN HEALTH AND THE ENVIRONMENT DUE TO DIRECT CONTACT WITH CONTAMINATED SOIL AT THE SITE AND INGESTION OF GROUNDWATER CONTAMINATED FROM LEACHING FROM THE SOIL. TWO SOIL STRATEGIES WERE DEVELOPED TO MITIGATE THESE RISKS. THE FIRST STRATEGY (7,125 CUBIC YARDS) ADDRESSES ONLY THE DIRECT CONTACT THREAT; IN THAT STRATEGY THE SOURCE OF CONTAMINATION AT THE SITE REMAINS TO LEACH INTO THE GROUNDWATER AT SOME FUTURE TIME. THE SECOND STRATEGY (37,700 CUBIC YARDS) ADDRESSES ALL MIGRATION PATHWAYS AND RISK TO HUMAN HEALTH AND THE ENVIRONMENT (DIRECT CONTACT AND FUTURE LEACHING INTO GROUNDWATER FROM THE SOIL AT THE SITE).

GROUNDWATER ANALYSIS

THE CONCENTRATIONS OF VOLATILE ORGANIC COMPOUNDS AND METALS IN THE UPPER, MIDDLE AND LOWER OUTWASH LENSES OF THE UPPER AQUIFER AND IN THE LOWER AQUIFER ARE CONSISTENTLY GREATER THAN MCLS, TABLE 1 VALUES ARE RISK-BASED VALUES. (RISK-BASED VALUES ARE THE CALCULATED EXCESS LIFETIME CANCER RISK LEVELS). THEREFORE, EXTRACTION AND TREATMENT OF GROUNDWATER FROM THE UPPER OUTWASH LENS, THE MIDDLE OUTWASH LENSES, AND THE LOWER OUTWASH

LENS/LOWER AQUIFER IS NECESSARY TO PROTECT PUBLIC HEALTH AND THE ENVIRONMENT.

USE OF FRENCH DRAINS OR SUBSURFACE DRAINS TO COLLECT AND EXTRACT GROUNDWATER FROM THE UPPER OUTWASH LENS IS PROPOSED. THE FRENCH DRAIN IS DESCRIBED IN DETAIL IN THE FS. THE SYSTEM WILL BE CONSTRUCTED ALONG THE WESTERN AND NORTHERN EDGE OF THE UPPER OUTWASH LENS TO A DEPTH OF APPROXIMATELY 16 FEET.

USE OF ONE EXTRACTION WELL IS PROPOSED TO CAPTURE GROUNDWATER FROM BENEATH THE SITE. (THE NEED FOR ADDITIONAL WELLS, FINAL WELL PLACEMENT, AND PUMPING RATES WILL BE DETERMINED BY CONDUCTING A PUMP TEST AT THE SITE). THIS EXTRACTION WELL WOULD BE LOCATED ON THE WESTERN EDGE OF THE SITE AS SHOWN IN FIGURE 8. THIS WELL, WHICH WILL BE APPROXIMATELY 100 FEET DEEP, WILL BE SCREENED 25 FEET INTO THE LOWER AQUIFER. THIS WELL WILL PUMP APPROXIMATELY 300 GALLONS PER MINUTE (GPM) IN ORDER TO CAPTURE GROUNDWATER BENEATH THE SITE TO A DEPTH OF 25 FEET, INCLUDING GROUNDWATER FROM THE LOWER OUTWASH LENS. A PUMP TEST WILL BE CONDUCTED TO ASSESS THE RELATIONSHIP BETWEEN THE MIDDLE AND LOWER OUTWASH LENSES AND THE LOWER AQUIFER. ADDITIONAL GROUNDWATER MONITORING WILL ALSO BE DONE TO CONFIRM THE PLACEMENT OF THE WELL.

ON-SITE TREATMENT OF GROUNDWATER IS CONSIDERED APPROPRIATE FOR THE UPPER AQUIFER AND THE LOWER AQUIFER AT THE PRISTINE, INC. SITE. SINCE THE LEVEL AND NATURE OF CONTAMINATION AND THE RATE OF GROUNDWATER EXTRACTION ARE DIFFERENT FOR EACH AQUIFER THE GROUNDWATER WILL BE EXTRACTED AND TREATED DIFFERENTLY.

GROUNDWATER IN THE UPPER OUTWASH LENS OF THE UPPER AQUIFER CONTAINS VOLATILE AND SEMI-VOLATILE ORGANIC CONTAMINANTS. ON-SITE TREATMENT USING GRANULAR ACTIVATED CARBON (GAC) IS CONSIDERED APPROPRIATE BECAUSE OF THE LOW EXTRACTION RATE (1-5 GPM) AND A TOTAL PORE VOLUME OF 1,000,000 GALLONS IN THE UPPER OUTWASH LENS. SAMPLING OF THE GAC FOR RADON DECAY PRODUCTS IS REQUIRED.

GROUNDWATER IN THE LOWER AQUIFER HAS RELATIVELY LOW CONCENTRATIONS OF VOLATILE ORGANIC CONTAMINANTS. THE RATE OF EXTRACTION IS ESTIMATED TO BE IN THE RANGE OF 300 GPM. REMOVAL OF VOLATILE ORGANICS BY AIR STRIPPING WITH CARBON OFF-GAS TREATMENT IS THE RECOMMENDED TREATMENT FOR THIS GROUNDWATER. THE CARBON WILL NEED TO BE MONITORED FOR BREAKTHROUGH OF RADON GAS EMISSIONS. IN ADDITION, IF RADON DECAY PRODUCTS ARE PRESENT THE GAMMA EXPOSURE RATE SHOULD BE CONSIDERED AS A POTENTIAL OCCUPATIONAL THREAT TO WORKERS FROM THE CARBON BED. THE TREATMENT WILL REMOVE 90 TO 99 PERCENT OF THE CONTAMINANTS. THIS TREATMENT METHOD IS EXPECTED TO REDUCE ORGANIC CONTAMINANT LEVELS TO CONCENTRATIONS THAT WILL MEET THE NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) REQUIREMENTS.

THE ESTIMATED LENGTH OF EXTRACTION AND TREATMENT OF GROUNDWATER FROM THE LOWER OUTWASH LENS/LOWER AQUIFER WILL BE DEPENDENT ON THE EXTENT OF SOIL REMEDIATION AND THE EXTENT OF THE PLUME FROM THE PRISTINE, INC. SITE. THE ADDITIONAL PLUME DEFINITION WORK WILL BE CONDUCTED CONCURRENTLY WITH THE DESIGN. THE TIME NECESSARY TO REMEDIATE THE AQUIFER IS ULTIMATELY TIED TO MEETING TARGET CLEANUP LEVELS IN THE GROUNDWATER. THESE TARGET CLEANUP LEVELS ARE DISCUSSED IN THE SECTION ON CONSISTENCY WITH OTHER LAWS.

FOR SOIL REMEDIATION STRATEGY I (7,125 CUBIC YARDS), THE LENGTH OF GROUNDWATER TREATMENT IS ESTIMATED TO BE APPROXIMATELY 50 YEARS. THIS ESTIMATE IS BASED ON THE GROUNDWATER TRAVEL TIMES REPORTED IN THE RI AND ON THE ASSUMPTION THAT CONTAMINANTS WILL CONTINUE TO MIGRATE FROM THE SOILS OF THE UPPER OUTWASH LENS.

FOR SOIL REMEDIATION STRATEGY II (37,700 CUBIC YARDS), IT IS ESTIMATED THAT THE LENGTH OF TREATMENT FOR THE LOWER OUTWASH LENS/LOWER AQUIFER WILL BE APPROXIMATELY FIVE TO TEN YEARS. THE TREATMENT TIME IS DECREASED BECAUSE THE SOURCE, WHICH WILL CONTRIBUTE OVER TIME TO GROUNDWATER CONTAMINATION (THE UPPER OUTWASH LENS), IS REMOVED.

DESCRIPTION OF ALTERNATIVES

USING THIS INFORMATION, THE ALTERNATIVES ARE DESCRIBED IN DETAIL. THREE ADDITIONAL ALTERNATIVES WERE DEVELOPED TO ACCOUNT FOR THE TWO SOIL STRATEGIES. THE MAJOR COMPONENTS OF THE ALTERNATIVES ARE AS FOLLOWS:

ALTERNATIVE NUMBER	SOIL	STRUCTURES
1A	IN-SITU VITRIFICATION (37,700 YD3)	*
1B	ONSITE VITRIFICATION (7,125 YD3)	*
2A	ONSITE INCINERATION (37,700 YD3)	*
2B	ONSITE INCINERATION (7,125 YD3)	*
3A	OFFSITE LANDFILL (37,700 YD3)	*
3B	OFFSITE LANDFILL (37,700 YD3)	*
4	ONSITE LANDFILL (11,000 YD3)	ONSITE LANDFILL
5	MULTILAYER CAP	ONSITE CONSOLIDATION
6	NO ACTION	NO ACTION

* = DECONTAMINATION/SOLID WASTE LANDFILL.

NOTE: GROUNDWATER WILL BE EXTRACTED USING A FRENCH DRAIN AND A MINIMUM OF ONE EXTRACTION WELL AND AIR STRIPPING WITH CARBON OFF-GAS TREATMENT AND GRANULAR ACTIVATED CARBON (GAC) GROUNDWATER TREATMENT FOR ALL ALTERNATIVES EXCEPT 1A AND 6. 1A WILL NOT REQUIRE GAC WATER TREATMENT AND 6 WILL HAVE NO TREATMENT.

ALTERNATIVE 1A

THE MAJOR COMPONENTS OF ALTERNATIVE 1A ARE EXCAVATION AND ON-SITE CONSOLIDATION OF CONTAMINATED SEDIMENT, IN-SITU VITRIFICATION (ISV) OF AN AVERAGE OF TEN FEET OF CONTAMINATED SOIL AND SEDIMENT (37,700 CUBIC YARDS), CLAY CAP, GROUNDWATER EXTRACTION USING AN EXTRACTION WELL, GROUNDWATER TREATMENT USING AIR STRIPPING, DISCHARGE OF TREATED WATER TO MILL CREEK, DECONTAMINATION AND OFF-SITE DISPOSAL OF STRUCTURES, ACCESS RESTRICTIONS AND GROUNDWATER MONITORING.

ISV WILL REQUIRE THE INSERTION OF FOUR ELECTRODES IN A 25 FOOT SQUARE ARRAY. THE SOIL WILL BE VITRIFIED FOR VARYING DEPTHS ACROSS THE SITE AS SHOWN IN FIGURE 7.

A PATH FOR ELECTRIC CURRENT IS ESTABLISHED BY USING A SMALL AMOUNT OF GRAPHITE AND GLASS FRIT MIXTURE PLACED BETWEEN THE ELECTRODES ON THE SOIL SURFACE. DISSIPATION OF POWER THROUGH THE STARTER MATERIAL CREATES TEMPERATURES HIGH ENOUGH (UP TO 2000 DEGREES C) TO MELT SOIL. THIS MOLTEN ZONE CONTINUES TO GROW DOWNWARD, ENCOMPASSING THE CONTAMINATED SOIL. ROCKS, WHICH ARE LESS DENSE, CREATE A FLOATING ROCK LAYER NEAR THE MOLTEN SURFACE. THE ROCKS WILL EVENTUALLY BE INCORPORATED INTO THE MOLTEN MASS. AS THE MOLTEN, OR VITRIFIED ZONE GROWS, IT INCORPORATES NONVOLATILE HAZARDOUS ELEMENTS, SUCH AS HEAVY METALS, AND DESTROYS ORGANIC COMPOUNDS BY PYROLYSIS THROUGH THE ADDITION OF HEAT. THE PYROLYZED PRODUCTS MIGRATE TO THE SURFACE OF THE VITRIFIED ZONE WHERE THEY COMBUST IN THE PRESENCE OF OXYGEN. A HOOD PLACED OVER THE AREA BEING VITRIFIED DIRECTS GASEOUS EFFLUENT TO AN OFF-GAS TREATMENT SYSTEM. THE OFF-GAS TREATMENT SYSTEM COOLS, SCRUBS AND FILTERS THE EFFLUENT EXHAUSTED FROM THE HOOD. REMAINING ASH, ALONG WITH OTHER NONCOMBUSTIBLE MATERIALS, DISSOLVES OR BECOME ENCAPSULATED IN THE MOLTEN SOIL. NATURAL CONVECTIVE CURRENTS WITHIN THE MOLTEN SOILS HELP DISTRIBUTE THE STABILIZED MATERIALS UNIFORMLY. THE MOLTEN SOIL COOLS TO A DURABLE GLASS AND CRYSTALLINE WASTE FORM RESEMBLING NATURAL OBSIDIAN. AIR SAMPLING IS REQUIRED DURING THE VITRIFICATION PROCESS FOR VOLATILE ORGANIC COMPOUNDS AND RADON GAS. THE OFF-GAS CARBON TREATMENT MUST BE MONITORED FOR BREAKTHROUGH OF RADON DECAY PRODUCTS.

ALTERNATIVE 1A INVOLVES EXCAVATION OF CONTAMINATED SOIL FROM THE MAGIC PIT AREA AND CONSOLIDATION OF THIS SOIL ON THE SURFACE OF THE SITE. THIS CONTAMINATED SOIL WILL BE VITRIFIED ALONG WITH AN AVERAGE OF APPROXIMATELY TEN FEET OF CONTAMINATED SOIL ACROSS THE ENTIRE 2.2 ACRE SITE. (ONE AREA WILL BE VITRIFIED TO TWELVE FEET AND ANOTHER AREA TO EIGHT FEET.). VITRIFICATION OF THE ENTIRE SITE TO AN AVERAGE DEPTH OF TEN FEET WILL REQUIRE 157-25 X 25 X 10 FOOT CELLS. THE ESTIMATED TIME REQUIRED TO COMPLETE THE VITRIFICATION PROCESS IS TWO YEARS ASSUMING THE USE OF ONE VITRIFICATION UNIT. A VEGETATIVE SOIL COVER WILL BE PLACED OVER

THE VITRIFIED MASS.

ALTERNATIVE 1A REQUIRES THE INSTALLATION OF A FRENCH DRAIN ALONG THE EASTERN BOUNDARY OF THE SITE TO INTERCEPT GROUNDWATER THAT PRESENTLY FLOWS INTO THE ON-SITE UPPER OUTWASH LENS AND WILL NO LONGER BE ABLE TO DO SO BECAUSE THE LENS WILL ESSENTIALLY BE ELIMINATED BY THE VITRIFICATION PROCESS. THIS IS TO PREVENT GROUNDWATER MOUNDING. GROUNDWATER MOUNDING IS A CONCERN BECAUSE OF ITS POTENTIAL EFFECT ON THE STABILITY OF THE ADJACENT RAILROAD TRACKS. ALTHOUGH THE INTERCEPTED GROUNDWATER IS NOT ANTICIPATED TO BE CONTAMINATED SINCE IT WILL BE INTERCEPTED AS IT ENTERS THE SITE, IT WILL BE SENT TO THE TREATMENT SYSTEM PRIOR TO DISCHARGE TO MILL CREEK. AN ASSESSMENT WILL BE MADE DURING OPERATION TO DETERMINE WHETHER THERE IS A NEED TO CONTINUE PUMPING.

EXTRACTION AND TREATMENT OF GROUNDWATER FROM THE MIDDLE AND LOWER LENSES AND LOWER AQUIFER IS REQUIRED. AT LEAST ONE EIGHT-INCH EXTRACTION WELL WILL BE PLACED TO ALLOW EXTRACTION OF GROUNDWATER. THE DURATION OF THE CLEANUP WILL BE DICTATED BY MONITORING RESULTS, AND THE TREATMENT TIME WILL ULTIMATELY BE BASED ON MEETING TARGET CLEANUP LEVELS IN THE CONTAMINATED GROUNDWATER THAT HAS AND WILL HAVE MIGRATED FROM THE SITE. IT IS ESTIMATED THAT IT WILL TAKE FIVE TO TEN YEARS TO EXTRACT AND TREAT THE CONTAMINATED GROUNDWATER. FUTURE WORK WILL BE DONE TO DEFINE THE EXTENT OF CONTAMINATION FROM THE PRISTINE, INC. SITE IN THE LOWER AQUIFER. THIS MAY INCREASE THE EXTRACTION AND TREATMENT TIME. THE RECOVERY WELL OR WELLS WILL BE SCREENED IN THE UPPER 25 FEET OF THE LOWER AQUIFER.

THE ON-SITE TREATMENT FACILITY WILL CONSIST OF AIR STRIPPING WITH CARBON OFF-GAS FOR TREATMENT OF GROUNDWATER. BENCH SCALE STUDIES WILL BE DONE TO DETERMINE THE NEED FOR METALS TREATMENT. THIS FACILITY MAY NEED TO BE LOCATED ADJACENT TO THE SITE.

EFFLUENT WILL BE DISCHARGED TO MILL CREEK. THE EFFLUENT QUALITY WILL MEET NPDES DISCHARGE LIMITS.

ALTERNATIVE 1A WILL INCLUDE DECONTAMINATION AND DEMOLITION OF ALL ON-SITE STRUCTURES. THIS INCLUDES BUILDINGS, THE INCINERATOR, FOUNDATIONS, CONCRETE PADS, AND STORAGE TANKS. FOLLOWING DECONTAMINATION, THE DEBRIS WILL BE DISPOSED OF IN A NON-RCRA LANDFILL.

THE SITE IS PRESENTLY FENCED ALONG THE NORTHERN, SOUTHERN AND EASTERN BOUNDARIES. THE SITE IS NOT FENCED ALONG THE WESTERN BOUNDARY AND ACCESS TO THE SITE IS UNRESTRICTED TO EMPLOYEES OF THE ADJACENT INDUSTRIAL FACILITY. FENCING OF THE WESTERN BOUNDARY WILL LIMIT ACCESS TO THE SITE AND WOULD PREVENT EXPOSURE TO CONTAMINANTS PRESENT AT THE SITE. THE USE OF DEED RESTRICTIONS WILL BE CONSIDERED DURING THE REMEDIAL DESIGN. GROUNDWATER MONITORING WILL BE UNDERTAKEN.

OVERALL IMPLEMENTATION OF ALTERNATIVE 1A IS ESTIMATED TO TAKE 2.8 YEARS. HOWEVER, TREATMENT OF GROUNDWATER FROM THE LOWER AQUIFER WILL CONTINUE UNTIL TARGET CLEANUP CONCENTRATIONS ARE MET IN THE GROUNDWATER. THESE TARGET CLEANUP LEVELS ARE DISCUSSED IN THE SECTION ON CONSISTENCY WITH OTHER LAWS.

ALTERNATIVE 1B

THE MAJOR COMPONENTS OF ALTERNATIVE 1B ARE THE SAME AS ALTERNATIVE 1A WITH SEVERAL EXCEPTIONS. ALTERNATIVE 1B INVOLVES ON-SITE VITRIFICATION WHEREBY 7,125 CUBIC YARDS OF SOIL WILL BE MOVED TO THE SOUTHERN HALF OF THE SITE AND VITRIFIED ON TOP OF THE SITE. ALSO, THE SITE WILL BE COVERED WITH A RCRA CAP, AND THE GROUNDWATER IN THE UPPER OUTWASH LENS WILL BE TREATED USING GAC. THE GAC WILL REQUIRE ANALYSIS FOR RADON. THE FRENCH DRAIN WILL BE LOCATED ALONG THE WESTERN AND NORTHERN EDGE OF THE UPPER OUTWASH LENS, RATHER THAN ON THE EASTERN EDGE OF THE SITE, TO CAPTURE THE CONTAMINATED GROUNDWATER. THE STRUCTURES WILL BE DEMOLISHED, DECONTAMINATED, AND DISPOSED OF AT AN OFF-SITE DISPOSAL FACILITY.

ALTERNATIVE 1B INVOLVES EXCAVATION OF AN AVERAGE OF TWO FEET OF CONTAMINATED SOIL ACROSS THE ENTIRE 2.2 ACRE SITE AND EXCAVATION OF CONTAMINATED SOIL FROM THE MAGIC PIT AREA. THE COMBINED 7,125 CUBIC YARDS OF CONTAMINATED SOIL WILL BE MOVED TO THE SOUTHERN END OF THE SITE FOR SUBSEQUENT VITRIFICATION. THE REASON FOR CONSOLIDATING THE CONTAMINATED SOIL AT ONE LOCATION, INSTEAD OF VITRIFYING THE SOIL IN PLACE AS IN ALTERNATIVE 1A, IS THAT VITRIFICATION TO A DEPTH OF ONLY TWO FEET IS THERMALLY INEFFICIENT. THEREFORE THE SOIL WILL BE PLACED ON THE SURFACE OF THE SITE AND WILL OCCUPY A SPACE OF APPROXIMATELY 100 FEET X 175 FEET AND WILL EXTEND TO A HEIGHT OF TEN FEET ABOVE THE EXISTING GRADE AT THE SOUTHERN END OF THE SITE. SINCE THE

SOIL TO BE VITRIFIED IS ABOVE GRADE, IT WILL BE NECESSARY TO CONFINE THE SIDES OF THE CONTAMINATED SOIL MASS. THIS WILL BE ACCOMPLISHED BY SURROUNDING THE CONTAMINATED SOIL MASS WITH AN EMBANKMENT (3:1 SLOPE) CONSTRUCTED WITH CLEAN SOIL BROUGHT FROM OFF-SITE. THE COMBINED AREA OCCUPIED BY THE CONTAMINATED SOIL AND THE CONFINING EMBANKMENT WILL BE APPROXIMATELY 170 FEET X 230 FEET AND IS ESSENTIALLY THE ENTIRE SOUTHERN PART OF THE SITE. THE ENTIRE SITE WILL BE CAPPED WITH A RCRA CAP.

THE VITRIFICATION PROCESS WILL BE ACCOMPLISHED IN 35-25 X 25 X 10 FOOT CELLS. THE ESTIMATED TIME REQUIRED TO COMPLETE THE VITRIFICATION PROCESS INCLUDING EXCAVATION OF THE CONTAMINATED SOIL AND PREPARATION OF THE SOIL FOR VITRIFICATION IS SIX MONTHS. AIR SAMPLING IS REQUIRED DURING THE VITRIFICATION PROCESS.

ALTERNATIVE 1B REQUIRES THE EXTRACTION AND TREATMENT OF GROUNDWATER FROM THE UPPER OUTWASH LENS BECAUSE THE LENS WILL NOT BE VITRIFIED UNDER THIS ALTERNATIVE. THE VOLUME OF WATER WITHIN THE LENS AT ANY ONE TIME IS ESTIMATED TO BE APPROXIMATELY 1,000,000 GALLONS. A FRENCH DRAIN SYSTEM WILL BE USED TO EXTRACT THE GROUNDWATER IN THE UPPER OUTWASH LENS AND ACT AS A BARRIER TO INTERCEPT FLOW THROUGH THE LENS. THE FRENCH DRAIN WILL BE INSTALLED ALONG THE WESTERN AND NORTHERN BOUNDARIES OF THE LENS. THE FRENCH DRAIN WILL BE 400 FEET LONG AND 16 FEET DEEP. IT IS ESTIMATED THAT IT WILL TAKE APPROXIMATELY SIX MONTHS TO EXTRACT THE GROUNDWATER (ONE PORE VOLUME) FROM THE UPPER OUTWASH LENS. RESIDUAL CONTAMINATION IN THE SOIL WILL REMAIN AFTER THE LENS IS DRAINED. EXTRACTION OF GROUNDWATER FROM THE MIDDLE AND LOWER OUTWASH LENSES AND LOWER AQUIFER WILL BE DONE USING A WELL (OR WELLS).

ALTERNATIVE 2A

THE MAJOR COMPONENTS OF ALTERNATIVE 2A ARE THE SAME AS ALTERNATIVE 1A WITH SEVERAL EXCEPTIONS. THE SOIL WILL BE INCINERATED IN AN ON-SITE FACILITY AND THE GROUNDWATER IN THE UPPER OUTWASH LENS WILL BE TREATED USING GAC. SIGNIFICANT QUANTITIES OF ASH (POTENTIALLY AS MUCH AS 85% OF THE ORIGINAL VOLUME) WOULD RESULT. AIR MONITORING IS REQUIRED DURING IMPLEMENTATION.

FOR PURPOSES OF THE FEASIBILITY STUDY (FS), U.S. EPA ASSUMED THAT THE ASH WOULD BE DELISTED AND REMAIN ON-SITE, COVERED WITH CLEAN FILL AND COMPACTED.

IT IS EXPECTED THAT IMPLEMENTATION OF THIS REMEDY, EXCLUDING GROUNDWATER REMEDIATION, WILL BE ABOUT TWO YEARS.

ALTERNATIVE 2B

ALTERNATIVE 2B INVOLVES THE SAME COMPONENTS AS ALTERNATIVE 1B EXCEPT THAT THE SOIL IS TO BE INCINERATED RATHER THAN VITRIFIED.

THE TIME TO IMPLEMENT THIS REMEDY, EXCLUDING GROUNDWATER REMEDIATION, IS 1.5 YEARS.

ALTERNATIVE 3A

THE MAJOR COMPONENTS OF ALTERNATIVE 3A ARE THE SAME AS ALTERNATIVE 1A EXCEPT THAT THE SOIL WILL BE EXCAVATED AND DISPOSED OF, WITHOUT TREATMENT, IN AN OFF-SITE LAND DISPOSAL FACILITY AND THE GROUNDWATER IN THE UPPER OUTWASH LENS WILL BE TREATED USING GAC. BECAUSE THERE IS DIOXIN PRESENT IN SOME OF THE SOIL AND ASH, AND DUE TO THE UNCERTAINTIES ASSOCIATED WITH TREATMENT STANDARDS, OFFSITE DISPOSAL OF DIOXIN-CONTAMINATED SOIL AND ASH MAY NOT BE IMPLEMENTABLE DUE TO THE LAND DISPOSAL RESTRICTIONS. THOSE SOILS WOULD NEED TO BE INCINERATED OR TREATED SEPARATELY.

IT IS EXPECTED THAT IMPLEMENTATION OF THIS REMEDY, EXCLUDING GROUNDWATER REMEDIATION, WILL BE ABOUT A YEAR.

ALTERNATIVE 3B

ALTERNATIVE 3B INVOLVES THE SAME COMPONENTS AS ALTERNATIVE 1B EXCEPT THAT THE SOIL IS TO BE TRANSPORTED TO AN OFF-SITE DISPOSAL FACILITY RATHER THAN VITRIFIED. THE SAME ISSUE REGARDING DIOXIN APPLIES TO THIS ALTERNATIVE.

THE TIME TO IMPLEMENT THIS REMEDY, EXCLUDING THE GROUNDWATER REMEDIATION, IS ABOUT ONE YEAR.

ALTERNATIVE 4

THE MAJOR COMPONENTS OF ALTERNATIVE 4 ARE EXCAVATION OF AN APPROXIMATELY 7,125 CUBIC YARDS OF CONTAMINATED SOIL AND SEDIMENT, DISPOSAL IN AN ON-SITE RCRA-TYPE CELL, AND INSTALLATION OF A RCRA-TYPE CAP OVER THE REMAINDER OF THE SITE. ALL OTHER COMPONENTS OF THIS ALTERNATIVE ARE THE SAME AS ALTERNATIVE 1B. THE DIOXIN CONTAMINATED SOIL WOULD NEED TO BE MANAGED AS IN ALTERNATIVE 3A.

THE ESTIMATED VOLUME OF MATERIAL TO BE CONTAINED IN THE CELL IS 11,000 CUBIC YARDS. THIS VOLUME ACCOUNTS FOR EXCAVATED SOIL AND DEBRIS AS A RESULT OF DEMOLITION OF EXISTING STRUCTURES. THE RCRA-TYPE CELL WITH DIMENSIONS OF 120 FEET X 300 FEET WOULD BE DESIGNED TO COMPLY WITH RCRA GUIDELINES. THE RCRA-TYPE CELL WOULD BE CONSTRUCTED WITH FIVE FEET OF STORAGE CAPACITY BELOW GRADE AND WITH SIX FEET OF STORAGE CAPACITY ABOVE GRADE. THE CELL WOULD BE A BOTTOM LINER SYSTEM CONSISTING OF TWO SYNTHETIC LINERS, CLAY LINER, LEACHATE DETECTION SYSTEM AND A LEACHATE COLLECTION SYSTEM. THE FINAL COVER WOULD INCLUDE A CLAY LINER, FLEXIBLE MEMBRANE LINER, DRAINAGE LAYER, FILTER LAYER, AND A VEGETATED TOP SOIL LAYER. A RCRA-TYPE CAP WOULD BE INSTALLED ACROSS THE REMAINDER OF THE SITE SINCE SOME CONTAMINATED SOIL RESIDUAL WOULD REMAIN AT THE SITE OUTSIDE THE RCRA-TYPE CELL.

OVERALL IMPLEMENTATION OF THIS REMEDIAL ACTION, EXCLUDING GROUNDWATER TREATMENT, IS EXPECTED TO TAKE APPROXIMATELY ONE YEAR.

ALTERNATIVE 5

THE MAJOR COMPONENT OF ALTERNATIVE 5 IS INSTALLATION OF A RCRA CAP OVER THE ENTIRE SITE. THE OTHER COMPONENTS OF THIS ALTERNATIVE ARE THE SAME AS ALTERNATIVE 1B.

A MULTILAYER CAP WOULD BE INSTALLED OVER THE ENTIRE SITE. THE MULTILAYER CAP WOULD CONFORM TO THE RCRA STANDARDS FOR CLOSURE OF A HAZARDOUS WASTE LANDFILL. THE RCRA "MODEL" CAP CONSISTS OF THE FOLLOWING: A CLAY LINER, A BEDDING LAYER INSTALLED ON TOP OF THE CLAY LINER, AN IMPERVIOUS LAYER, (SYNTHETIC LINER), A DRAINAGE LAYER, AND A VEGETATIVE COVER.

OVERALL IMPLEMENTATION OF THIS REMEDIAL ACTION, EXCLUDING GROUNDWATER TREATMENT, IS EXPECTED TO TAKE ONE YEAR.

ALTERNATIVE 6

UNDER THIS ALTERNATIVE, NO REMEDIAL ACTION WILL BE TAKEN AT THE SITE. ENDANGERMENT TO PUBLIC HEALTH AND THE ENVIRONMENT WILL NOT BE MITIGATED. IT IS PRIMARILY INCLUDED AS A BASELINE SCENARIO TO WHICH OTHER ALTERNATIVES CAN BE COMPARED.

#AE

ALTERNATIVES EVALUATION

EACH OF THE SIX ALTERNATIVES WAS EVALUATED USING A NUMBER OF EVALUATION FACTORS. THE REGULATORY BASIS FOR THESE FACTORS COMES FROM THE NATIONAL CONTINGENCY PLAN AND SECTION 121 OF SARA (CLEANUP STANDARDS). SECTION 121(B)(1) STATES THAT, "REMEDIAL ACTIONS IN WHICH TREATMENT WHICH PERMANENTLY AND SIGNIFICANTLY REDUCES THE VOLUME, TOXICITY OR MOBILITY OF THE HAZARDOUS SUBSTANCES, POLLUTANTS, AND CONTAMINANTS IS A PRINCIPLE ELEMENT, ARE TO BE PREFERRED OVER REMEDIAL ACTIONS NOT INVOLVING SUCH TREATMENT. THE OFFSITE TRANSPORT AND DISPOSAL OF HAZARDOUS SUBSTANCES OR CONTAMINATED MATERIALS WITHOUT SUCH TREATMENT SHOULD BE THE LEAST FAVORED ALTERNATIVE REMEDIAL ACTION WHERE PRACTICABLE TREATMENT TECHNOLOGIES ARE AVAILABLE.". SECTION 121(B)(1) ALSO STATES THAT THE FOLLOWING FACTORS SHALL BE ADDRESSED DURING THE REMEDY SELECTION PROCESS:

- (A) THE LONG-TERM UNCERTAINTIES ASSOCIATED WITH LAND DISPOSAL;
- (B) THE GOALS, OBJECTIVES, AND REQUIREMENTS OF THE SOLID WASTE DISPOSAL ACT;
- (C) THE PERSISTENCE, TOXICITY, MOBILITY, AND PROPENSITY TO BIOACCUMULATE OF SUCH HAZARDOUS SUBSTANCES AND THEIR CONSTITUENTS;
- (D) SHORT- AND LONG-TERM POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM HUMAN EXPOSURE;
- (E) LONG-TERM MAINTENANCE COSTS;
- (F) THE POTENTIAL FOR FUTURE REMEDIAL ACTION COSTS IF THE ALTERNATIVE REMEDIAL ACTION IN QUESTION WERE TO FAIL; AND
- (G) THE POTENTIAL THREAT TO HUMAN HEALTH AND THE ENVIRONMENT ASSOCIATED WITH EXCAVATION, TRANSPORTATION, AND REDISPOSAL, OR CONTAINMENT.

SECTION 121 OF SARA REQUIRES THAT THE SELECTED REMEDY IS TO BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, COST-EFFECTIVE, AND USES PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE.

IN ADDITION TO THE FACTORS LISTED IN SECTION 121 OF SARA, ALTERNATIVES WERE EVALUATED USING CURRENT U.S. EPA GUIDANCE, INCLUDING: "INTERIM GUIDANCE ON SUPERFUND SELECTION OF REMEDY" DATED DECEMBER 24, 1986 AND "ADDITIONAL INTERIM GUIDANCE FOR FY'87 RECORDS OF DECISION" DATED JULY 24, 1987. IN THE JULY 24, 1987 GUIDANCE, THE FOLLOWING NINE EVALUATION FACTORS ARE REFERENCED:

1. COMPLIANCE WITH APPLICABLE, OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)
(SEE DISCUSSION BELOW)
2. REDUCTION OF TOXICITY, MOBILITY, OR VOLUME
3. SHORT-TERM EFFECTIVENESS
4. LONG-TERM EFFECTIVENESS AND PROTECTIVENESS
5. IMPLEMENTABILITY
6. COST
7. COMMUNITY ACCEPTANCE
8. STATE ACCEPTANCE
9. OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT.

THE ANALYSIS IN THE FOLLOWING SECTION WAS PERFORMED USING THE ABOVE FACTORS. TABLE 8 IS A SUMMARY OF THIS EVALUATION.

ALTERNATIVE 1A

ALTERNATIVE 1A USES TREATMENT AS A PRINCIPAL ELEMENT FOR CONTAMINATED MEDIA. THE ALTERNATIVE INCLUDES IN-SITU VITRIFICATION OF APPROXIMATELY 37,700 CUBIC YARDS OF SOIL AND TREATMENT OF GROUNDWATER. THIS ALTERNATIVE IS EXPECTED TO ATTAIN ALL IDENTIFIED FEDERAL AND STATE ARARS.

VITRIFICATION FOR SOIL TREATMENT IS NOT A "PROVEN" TECHNOLOGY, ALTHOUGH THERE HAVE BEEN AT LEAST FOUR FULL-SCALE DEMONSTRATIONS AND FORTY THREE BENCH OR PILOT STUDIES. VITRIFICATION IS EXPECTED TO BE EFFECTIVE ON THE SOIL TYPE PRESENT AT THE PRISTINE, INC. SITE. (VITRIFICATION IS ALSO DISCUSSED IN DETAIL IN THE FS.). VITRIFICATION WILL ENCAPSULATE THE METALS AND PYROLYZE THE ORGANICS PRESENT IN THE SOILS. THE ORGANICS, SOME OF WHICH ARE EXPECTED TO VOLATILIZE, WILL BE CAPTURED BY A VACUUM HOOD. AIR MONITORING WILL BE CONDUCTED TO ENSURE THAT THE HOOD IS COLLECTING AND TREATING THE GASES. THIS ALTERNATIVE WILL ADDRESS SOIL CONTAMINATION TO LEVELS THAT WILL PROTECT HUMAN HEALTH AND THE ENVIRONMENT BY TREATING CONTAMINATED SOIL THAT CONTRIBUTES TO A DIRECT CONTACT THREAT THROUGH INCIDENTAL INGESTION AND ABSORPTION, AND BY TREATING SOILS TO LEVELS SUCH THAT THE RESIDUAL SOIL CONTAMINATION WILL NOT CONTRIBUTE TO GROUNDWATER CONTAMINATION IN THE FUTURE. SOME LIMITED MONITORING OF THE VITRIFIED MASS WILL BE REQUIRED TO ASSURE THAT IT IS A RELIABLE AND PERMANENT REMEDY. THE EXPECTED LIFE OF THE VITRIFIED MASS, REFERRED TO AS OBSIDIAN-LIKE MATERIAL, IS A MILLION YEARS. IN THE NATURAL ENVIRONMENT, THE VITRIFIED WASTE IS EXPECTED TO WEATHER LESS THAN 1-MILLIMETER (HYDRATED DEPTH) OVER A 10,000-YEAR TIME SPAN.

ALTERNATIVE 1A WILL SIGNIFICANTLY REDUCE THE MOBILITY, TOXICITY, AND VOLUME OF HAZARDOUS SUBSTANCES IN THE SOIL THROUGH TREATMENT. THE MOBILITY OF THE CONTAMINANTS WILL BE REDUCED SIGNIFICANTLY, SUCH THAT NO LEACHATE IS EXPECTED TO BE PRODUCED FROM THE VITRIFIED MATERIAL. THIS IS A PERMANENT TECHNOLOGY, THE RESULTS

OF WHICH ARE EXPECTED TO LAST FOR A MILLION YEARS. THE TOXICITY OF ORGANIC COMPONENTS WILL BE DECREASED BECAUSE THE ORGANICS ARE DESTROYED OR CHANGED TO OTHER FORMS BY PYROLYSIS OR VAPORIZATION. THE VOLUME OF THE SOIL WILL BE REDUCED BY 25-30 PERCENT BECAUSE THE VITRIFICATION CAUSES THE SOIL MASS TO CONSOLIDATE. DECONTAMINATION OF SITE STRUCTURES WILL BE CARRIED OUT IN ACCORDANCE WITH THE RCRA REQUIREMENTS AND WILL REDUCE THE THREAT ASSOCIATED WITH THESE CONTAMINATED STRUCTURES.

IMPLEMENTATION OF THIS REMEDY POSES SOME SHORT TERM RISKS DUE TO INHALATION OF DUST DURING SOIL EXCAVATION AND DECONTAMINATION PROCEDURES. DURING THE VITRIFICATION PROCEDURE, SOME ORGANIC COMPOUNDS WILL VOLATILIZE. A VACUUM HOOD OVER THE VITRIFIED AREA WILL BE DESIGNED TO CONTROL AND TREAT ANY RELEASE OF GAS TO THE ENVIRONMENT. THERE IS A SHORT TERM RISK FROM THE HEAT GENERATED IN THE PROCESS. IMPLEMENTATION OF THIS ALTERNATIVE IS EXPECTED TO TAKE 2.8 YEARS TO COMPLETE. THE EQUIPMENT MUST BE SPECIALLY DESIGNED AND PRODUCED. APPROXIMATELY SIX TO TWELVE MONTHS WILL BE NEEDED TO MANUFACTURE THE EQUIPMENT. THIS WILL OCCUR CONCURRENTLY WITH THE REMEDIAL DESIGN. IT IS ESTIMATED THAT GROUNDWATER WILL BE EXTRACTED AND TREATED FOR APPROXIMATELY FIVE TO TEN YEARS.

ALTHOUGH THERE HAVE BEEN LIMITED PERFORMANCE DEMONSTRATIONS, IT IS EXPECTED THAT THE VITRIFICATION WILL ATTAIN 99.9999% DESTRUCTION AND REMOVAL EFFICIENCY (DRE). THE ALTERNATIVE WILL REQUIRE A TRAINED LEVEL OF EXPERTISE TO OPERATE THE POWER INPUT AND TO OVERSEE THE MOVEMENT OF THE EQUIPMENT.

ALTHOUGH NO ON-SITE PERMITS ARE NEEDED, THE TECHNICAL REQUIREMENTS OF NPDES FOR THE SURFACE WATER DISCHARGE WILL BE MET. ISV IS A PATENTED PROCESS WHICH REQUIRES A LICENSE.

THE GROUNDWATER EXTRACTION/TREATMENT SYSTEM WILL REDUCE THE MOBILITY, TOXICITY AND VOLUME OF HAZARDOUS SUBSTANCES IN THE GROUNDWATER AT THE SITE. THIS EXTRACTION AND TREATMENT SYSTEM WILL RESULT IN COMPLIANCE WITH FEDERAL AND STATE ARARS. THIS PORTION OF THE ALTERNATIVE IS FULLY PROTECTIVE OF PUBLIC HEALTH AND THE ENVIRONMENT AT THE SITE.

THE CAPITAL COST OF THIS ALTERNATIVE IS \$20,837,000, THE ANNUAL OPERATION AND MAINTENANCE (O&M) COST IS \$94,800 AND THE PRESENT WORTH COST IS \$21,731,000.

ALTERNATIVE 1A WILL BE FULLY PROTECTIVE OF PUBLIC HEALTH AND THE ENVIRONMENT.

ALTERNATIVE 1B

ALTERNATIVE 1B ALSO USES TREATMENT AS A PRINCIPAL ELEMENT AND DECREASES THE MOBILITY, TOXICITY AND VOLUME OF THE WASTE. THIS ALTERNATIVE WILL MEET ALL IDENTIFIED STATE AND FEDERAL ARARS. THE MAJOR DIFFERENCE IS THAT THIS ALTERNATIVE IS LESS PERMANENT AND PROTECTIVE THAN ALTERNATIVE 1A SINCE RESIDUAL SOIL CONTAMINATION WILL REMAIN. IT MAY LEACH INTO THE GROUNDWATER AT LEVELS THAT WILL EXCEED ARARS AT SOME FUTURE TIME AND THUS INCREASE THE GROUNDWATER TREATMENT TIME OR REQUIRE ADDITIONAL FUTURE REMEDIAL ACTION. AN ESTIMATED 7,125 CUBIC YARDS OF SOIL WILL BE VITRIFIED ON-SITE TO ELIMINATE THE DIRECT CONTACT THREAT AND SITE STRUCTURES WILL BE DECONTAMINATED AND LANDFILLED OFFSITE.

THE EFFECTIVENESS OF THIS ALTERNATIVE IS DEPENDENT ON MAINTAINING THE INTEGRITY OF THE CAP THROUGH PROPER OPERATION AND MAINTENANCE (O&M). THE CAP WILL REDUCE THE RATE OF INFILTRATION OF GROUNDWATER THROUGH THE CONTAMINATED SOILS, THEREBY REDUCING THE VOLUME OF LEACHATE PRODUCED AT THE SITE. THE LIFETIME OF A RCRA MULTILAYER CAP IS FINITE, AND THE CONTAMINATED SOILS WILL BE LEFT IN PLACE TO CONTRIBUTE TO GROUNDWATER CONTAMINATION AT SOME FUTURE TIME SHOULD THE CAP FAIL. ALTERNATIVE 1B IS LESS PROTECTIVE THAN ALTERNATIVE 1A BASED ON LONG TERM PROTECTIVENESS. THERE ARE POSSIBLE SHORT TERM THREATS DUE TO POTENTIAL RELEASES OF VOLATILES DURING THE VITRIFICATION PROCESS, ALTHOUGH THE VITRIFICATION SYSTEM WILL BE SPECIFICALLY DESIGNED WITH A HOOD TO ADDRESS THE RELEASE OF VOLATILES.

ALTERNATIVE 1B REQUIRES EXCAVATION AND CONSOLIDATION OF THE WASTES. THIS POSES A SHORT-TERM THREAT TO PUBLIC HEALTH AND THE ENVIRONMENT.

THE ELEMENTS OF THE GROUNDWATER EXTRACTION EVALUATION ARE THE SAME WITH THE EXCEPTION THAT GROUNDWATER WILL BE TREATED OVER TIME IN THE UPPER OUTWASH LENS, SINCE THIS LENS WILL NOT BE VITRIFIED. THE GROUNDWATER EXTRACTION/TREATMENT SYSTEM WILL MEET FEDERAL AND STATE ARARS, USES TREATMENT AS A PRINCIPAL ELEMENT, AND

REDUCES THE MOBILITY, TOXICITY AND VOLUME OF CONTAMINANTS.

THE CAPITAL COST OF THIS ALTERNATIVE IS \$6,995,000, THE ANNUAL O&M COST IS \$99,200, AND THE PRESENT WORTH COST IS \$7,930,000.

ALTERNATIVE 2A

ALTERNATIVE 2A USES TREATMENT AS A PRINCIPAL ELEMENT FOR ALL CONTAMINATED MEDIA AND REDUCES THE MOBILITY, TOXICITY AND VOLUME OF THE WASTE. APPROXIMATELY 37,700 CUBIC YARDS OF CONTAMINATED SOIL WILL BE INCINERATED, STRUCTURES WILL BE DECONTAMINATED, AND GROUNDWATER WILL BE EXTRACTED AND TREATED. THIS ALTERNATIVE WILL ATTAIN ALL IDENTIFIED FEDERAL AND STATE ARARS.

INCINERATION IS A PROVEN TECHNOLOGY, WHICH WILL PERMANENTLY DESTROY ORGANIC CHEMICALS IN THE SOIL (99.9999% DRE). HOWEVER, METALS ARE NOT DESTROYED BY INCINERATION AND WILL BECOME MORE CONCENTRATED IN THE ASH. NONCOMBUSTIBLES AND ASH (POTENTIALLY AS MUCH AS 85 PERCENT OF THE ORIGINAL VOLUME) WILL BE CLASSIFIED AS HAZARDOUS BECAUSE THE CONTAMINATED SOIL IS CLASSIFIED AS A LISTED HAZARDOUS WASTE UNDER RCRA. THE DELISTING PROCEDURE WILL BE NECESSARY TO CLASSIFY THE WASTES AS NON-HAZARDOUS. INCINERATION OF 37,700 CUBIC YARDS OF CONTAMINATED SOIL IS FULLY PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT SINCE THE INGESTION AND LEACHABILITY THREATS ARE ELIMINATED. NO MONITORING OF THE ASH WILL BE REQUIRED. THE EXPECTED RELIABLE LIFE OF THIS ALTERNATIVE IS INFINITE.

IMPLEMENTATION OF THIS REMEDY POSES SOME SHORT TERM RISKS DUE TO INHALATION OF SOIL DUST DURING EXCAVATION AND STRUCTURE DECONTAMINATION. INCINERATION MAY RESULT IN SHORT-TERM LOW LEVEL EMISSIONS OF A SMALL FRACTION OF THE ORGANICS IN THE SOIL FEED AS WELL AS THE PRODUCTS OF INCOMPLETE COMBUSTION (E.G., DIOXINS). SINCE THERE WILL BE AN AIR POLLUTION CONTROL SYSTEM ON THE INCINERATOR TO DECREASE EMISSIONS OF PARTICULATE MATTER, EMISSIONS OF CONTAMINANTS WILL NOT EXCEED STANDARDS.

IMPLEMENTATION OF THIS REMEDY IS EXPECTED TO TAKE TWO YEARS AFTER THE EQUIPMENT IS OBTAINED. APPROXIMATELY SIX TO TWELVE MONTHS WILL BE NEEDED TO OBTAIN THE EQUIPMENT. THIS WILL OCCUR CONCURRENTLY WITH THE REMEDIAL DESIGN. THE USE OF MOBILE INCINERATORS IS COMMON AND THE PERFORMANCE OF THESE SYSTEMS HAS BEEN DEMONSTRATED. IT IS RELATIVELY EASY TO OPERATE THE SYSTEM ALTHOUGH A TRAINED OPERATOR WILL BE NEEDED.

ALTHOUGH NO ONSITE PERMITS WILL BE REQUIRED, THE REQUIREMENTS OF INCINERATION PERMITS WILL BE MET. THE OTHER ELEMENTS OF THIS ALTERNATIVE ARE THE SAME AS ALTERNATIVE 1A. THE CAPITAL COST OF ALTERNATIVE 2A IS \$50,595,000, THE ANNUAL O&M COST IS \$94,800 AND THE PRESENT WORTH COST IS \$51,489,000.

ALTERNATIVE 2A WILL BE FULLY PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT.

ALTERNATIVE 2B

ALTERNATIVE 2B ALSO USES TREATMENT AS A PRINCIPAL ELEMENT AND DECREASES THE MOBILITY, TOXICITY AND VOLUME OF THE WASTE. THIS ALTERNATIVE WILL MEET ALL IDENTIFIED STATE AND FEDERAL ARARS. THE MAJOR DIFFERENCE IS THAT THIS ALTERNATIVE IS LESS PERMANENT AND PROTECTIVE THAN ALTERNATIVE 2A SINCE RESIDUAL SOIL CONTAMINATION WILL REMAIN AT THE SITE THAT CAN LEACH INTO THE GROUNDWATER AT LEVELS THAT MAY EXCEED ARARS AT SOME FUTURE TIME AND THUS INCREASE THE GROUNDWATER EXTRACTION/TREATMENT TIME, OR REQUIRE ADDITIONAL FUTURE REMEDIAL ACTION.

APPROXIMATELY 7,125 CUBIC YARDS OF SOIL WILL BE INCINERATED ON-SITE AND STRUCTURES WILL BE DECONTAMINATED TO ELIMINATE THE DIRECT CONTACT THREAT. THE EFFECTIVENESS OF THIS ALTERNATIVE IS DEPENDENT ON MAINTAINING THE INTEGRITY OF THE CAP THROUGH O&M, SINCE SOIL CONTAMINATION REMAINS AT THE SITE. THE CAP WILL REDUCE THE RATE OF INFILTRATION OF GROUNDWATER THROUGH THE CONTAMINATED SOILS, THEREBY REDUCING THE VOLUME OF LEACHATE PRODUCED AT THE SITE. THE LIFETIME OF A RCRA MULTILAYER CAP IS FINITE, AND THE CONTAMINATED SOIL WILL BE LEFT IN PLACE TO CONTRIBUTE TO GROUNDWATER CONTAMINATION AT SOME FUTURE TIME SHOULD THE CAP FAIL. ALTERNATIVE 2B IS LESS PROTECTIVE THAN ALTERNATIVE 2A BASED ON LONG-TERM PROTECTIVENESS.

THE ELEMENTS OF THE GROUNDWATER EXTRACTION EVALUATION ARE THE SAME. AS THE GROUNDWATER EXTRACTION/TREATMENT SYSTEM IS THE SAME AS ALTERNATIVE 1B, IT WILL MEET FEDERAL AND STATE ARARS, IT USES TREATMENT AS A PRINCIPAL ELEMENT, AND REDUCES MOBILITY, TOXICITY AND VOLUME OF CONTAMINANTS. IMPLEMENTATION OF THIS REMEDY IS

EXPECTED TO TAKE 1.5 YEARS.

THE CAPITAL COST OF THIS ALTERNATIVE IS \$12,169,000, THE ANNUAL O&M COST IS \$99,200, AND THE PRESENT WORTH COST IS \$13,104,000.

ALTERNATIVE 3A

ALTERNATIVE 3A DOES NOT PROVIDE TREATMENT AS THE PRINCIPAL ELEMENT FOR 37,700 CUBIC YARDS OF CONTAMINATED SOIL, BUT DOES PROVIDE TREATMENT FOR STRUCTURES AND GROUNDWATER. ALTERNATIVE 3A WILL MEET ALL IDENTIFIED STATE AND FEDERAL ARARS.

ALTERNATIVE 3A IS PROTECTIVE OF PUBLIC HEALTH AND THE ENVIRONMENT AT THE SITE. IT ELIMINATES THE THREAT OF MIGRATION OF CONTAMINANTS THROUGH EXCAVATION AND CONTAINMENT OF ALL SOILS THAT HAVE THE POTENTIAL TO LEACH INTO THE GROUNDWATER. ALTERNATIVE 3A INVOLVES EXCAVATION AND CONTAINMENT OF SOILS WHICH CONTRIBUTE A THREAT TO HUMAN HEALTH VIA INGESTION AND ALL SOILS THAT WILL POSE A RISK WHEN LEACHATE IS PRODUCED. HOWEVER, THERE WILL BE NO REDUCTION OF TOXICITY OR VOLUME OF THE CONTAMINANTS AND THE REDUCTION OF MOBILITY DEPENDS ON MAINTAINING THE INTEGRITY OF THE OFF-SITE DISPOSAL CELL. ALTHOUGH THIS ALTERNATIVE ELIMINATES THE RISK TO HUMAN HEALTH AND THE ENVIRONMENT AT THE SITE DUE TO CONTAMINATED SOIL, THERE IS POTENTIAL FOR THE CONTAMINATED SOIL TO CAUSE A PROBLEM AT THE OFF-SITE FACILITY. ALTERNATIVE 3A MAY HAVE SIGNIFICANT SHORT-TERM IMPACTS ON PUBLIC HEALTH AND THE ENVIRONMENT DUE TO RISK INVOLVED IN THE EXCAVATION AND TRANSPORTATION OF CONTAMINATED SOIL. DIOXIN CONTAMINATION MAY NEED TO BE TREATED SEPARATELY OR LANDFILLED ON-SITE. SINCE THIS ALTERNATIVE INVOLVES PLACEMENT OF CONTAMINATED SOIL, THE LAND DISPOSAL RESTRICTIONS ARE ARARS. BECAUSE OF THE UNCERTAINTIES OF HOW THIS RESTRICTION WILL BE CARRIED OUT AND THE UNDEFINED TREATMENT STANDARDS, THIS ALTERNATIVE MAY NOT BE IMPLEMENTABLE.

AS THE GROUNDWATER EXTRACTION/TREATMENT SYSTEM IS THE SAME AS ALTERNATIVE 1A, IT WILL REDUCE THE MOBILITY, TOXICITY, AND VOLUME OF HAZARDOUS SUBSTANCES IN THE GROUNDWATER AT THE SITE. THIS EXTRACTION AND TREATMENT SYSTEM WILL RESULT IN COMPLIANCE WITH FEDERAL AND STATE ARARS. THIS PORTION OF THE ALTERNATIVE IS FULLY PROTECTIVE OF PUBLIC HEALTH AND THE ENVIRONMENT AT THE SITE.

IN SECTION 121 OF SARA, IT IS STATED THAT OFF-SITE DISPOSAL WITHOUT TREATMENT IS THE LEAST PREFERRED ALTERNATIVE. ALSO, ALTHOUGH ALTERNATIVE 3A IS READILY IMPLEMENTABLE FROM A CONSTRUCTION STANDPOINT, THE LAND DISPOSAL RESTRICTIONS MAY PRECLUDE ACTUAL IMPLEMENTATION OF THIS ALTERNATIVE.

THE CAPITAL COST OF THIS ALTERNATIVE IS \$20,834,000, THE ANNUAL O&M COST IS \$95,800, AND THE PRESENT WORTH COST IS \$21,737,000. ALTHOUGH ALTERNATIVE 3A WILL ESSENTIALLY ELIMINATE THREAT TO HUMAN HEALTH AND THE ENVIRONMENT AT THE SITE, TREATMENT IS NOT USED, THE ALTERNATIVE DOES NOT PROVIDE AN ADEQUATE LEVEL OF PERMANENCE AND IS THE LEAST PREFERRED UNDER SARA. IT IS EXPECTED THAT IT WILL TAKE APPROXIMATELY ONE YEAR TO IMPLEMENT THE SOIL REMOVAL.

ALTERNATIVE 3B

ALTERNATIVE 3B DOES NOT PROVIDE TREATMENT, DOES NOT REDUCE MOBILITY, TOXICITY AND VOLUME OF THE SOIL, AND PROVIDES THE SAME PROTECTION AT THE SITE AS ALTERNATIVES 1B AND 2B. THE SHORT AND LONG-TERM RISKS POSED BY THIS REMEDY ARE THE SAME AS FOR ALTERNATIVE 3A. SINCE THIS ALTERNATIVE INVOLVES PLACEMENT OF CONTAMINATED SOIL, THE LAND DISPOSAL RESTRICTIONS ARE ARARS. BECAUSE OF THE UNCERTAINTIES OF HOW THIS RESTRICTION WILL BE CARRIED OUT AND THE UNDEFINED TREATMENT STANDARDS, THIS ALTERNATIVE MAY NOT BE IMPLEMENTABLE. IMPLEMENTATION OF THIS REMEDY IS EXPECTED TO TAKE ABOUT ONE YEAR.

AS THE GROUNDWATER EXTRACTION/TREATMENT SYSTEM IS THE SAME AS ALTERNATIVE 1B, IT WILL MEET FEDERAL AND STATE ARARS, IT USES TREATMENT AS A PRINCIPAL ELEMENT, AND REDUCES MOBILITY, TOXICITY AND VOLUME OF CONTAMINANTS.

THE CAPITAL COST OF THIS ALTERNATIVE IS \$6,242,000, THE PRESENT WORTH COST IS \$7,186,000, AND THE O&M COST IS \$100,200.

ALTERNATIVE 4

ALTERNATIVE 4 IS A CONTAINMENT OPTION. ALTERNATIVE 4 INVOLVES CONTAINMENT OF 7,125 CUBIC YARDS OF SOIL AND THE STRUCTURES WHICH POSE A THREAT TO HUMAN HEALTH VIA INGESTION AT CONCENTRATIONS GREATER THAN THE CUMULATIVE EXCESS LIFETIME CANCER RISK. ALTERNATIVE 4 DOES NOT MITIGATE THE POTENTIAL FOR RELEASE OF CONTAMINANTS THAT EXCEED MCLS FROM THE SUBSURFACE SOILS INTO THE GROUNDWATER THROUGH INFILTRATION. POTENTIAL FOR ADDITIONAL REMEDIAL ACTION COSTS REMAINS. ALTERNATIVE 4 MEETS ALL IDENTIFIED STATE AND FEDERAL ARARS, AND MINIMIZES THE THREAT TO PUBLIC HEALTH AND THE ENVIRONMENT. IT DOES NOT TREAT THE CONTAMINATED SOIL. THERE IS NO REDUCTION IN TOXICITY OR VOLUME OF CONTAMINATED SOIL, AND THE REDUCTION OF MOBILITY IS DEPENDENT ON MAINTAINING THE EFFECTIVENESS OF THE DISPOSAL CELL AND THE RCRA CAP.

ALTHOUGH ALTERNATIVE 4 IS READILY IMPLEMENTABLE AND CONSTRUCTIBLE, THE LONG-TERM THREAT TO PUBLIC HEALTH AND THE ENVIRONMENT IS NOT MITIGATED. SINCE THIS ALTERNATIVE INVOLVES DISPOSAL, THE LAND DISPOSAL RESTRICTIONS WILL APPLY AND MAY PRECLUDE THIS ALTERNATIVE FROM BEING IMPLEMENTED. LONG-TERM RELIABILITY OF RCRA CELLS IS UNKNOWN SINCE THE PERFORMANCE DATA ARE UNKNOWN. ALTERNATIVE 4 WILL REQUIRE LONG-TERM MAINTENANCE OF THE DISPOSAL CELL AND MULTILAYER CAP. SOME SHORT TERM RISKS WILL BE POSED BY EXCAVATION OF SOIL AND CONSTRUCTION OF THE CELL. IMPLEMENTATION OF THIS REMEDY IS EXPECTED TO TAKE ONE YEAR.

AS THE GROUNDWATER EXTRACTION/TREATMENT SYSTEM IS THE SAME AS ALTERNATIVE 1B, IT WILL MEET FEDERAL AND STATE ARARS, IT USES TREATMENT AS A PRINCIPAL ELEMENT, AND REDUCES MOBILITY, TOXICITY AND VOLUME OF CONTAMINANTS.

BECAUSE THERE IS NO TREATMENT OF SOILS TO REDUCE THE MOBILITY, TOXICITY OR VOLUME, ALTERNATIVE 4 DOES NOT PROVIDE AN ADEQUATE LEVEL OF PERMANENCE SINCE THE HIGHLY MOBILE CONTAMINANTS REMAIN AT THE SITE. THE CAPITAL COST OF THIS ALTERNATIVE IS \$2,646,000, THE ANNUAL O&M COST IS \$101,500 AND THE PRESENT WORTH COST IS \$3,602,000.

ALTERNATIVE 5

ALTERNATIVE 5 IS A CONTAINMENT OPTION. THERE IS NO TREATMENT FOR SOIL TO REDUCE THE MOBILITY, TOXICITY OR VOLUME OF THE CONTAMINANTS. THERE IS TREATMENT OF THE STRUCTURES. ALTHOUGH MOBILITY WILL BE REDUCED BECAUSE OF THE REDUCTION OF INFILTRATION OF RAINWATER THROUGH THE CAP, THE POTENTIAL REMAINS FOR CONTAMINANTS TO CONTINUE TO MIGRATE SHOULD THE CAP FAIL, WHICH MAY NECESSITATE ADDITIONAL REMEDIAL ACTION COSTS. GROUNDWATER WILL CONTINUE TO CONTACT CONTAMINATED SOIL. THIS ALTERNATIVE IS PROTECTIVE OVER THE SHORT-TERM, ASSUMING THE CAP IS CONSTRUCTED EFFECTIVELY. HOWEVER, OVER THE LONG TERM, THIS ALTERNATIVE IS NOT PROTECTIVE. CONTAMINATED SOIL WILL REMAIN AT THE SITE AND IS NOT TREATED.

ALTERNATIVE 5 DOES NOT PROVIDE AN ADEQUATE LEVEL OF PERMANENCE SINCE THERE ARE HIGHLY MOBILE CONTAMINANTS REMAINING AT THE SITE. ADDITIONAL REMEDIAL ACTION COSTS MAY BE INCURRED SHOULD THE CAP FAIL IN THE FUTURE. LONG-TERM RELIABILITY IS UNKNOWN. PREVENTION OF FUTURE EXPOSURE DEPENDS ON THE EFFECTIVENESS OF ACCESS RESTRICTIONS AND AQUIFER USE RESTRICTIONS, NEITHER OF WHICH ARE ENFORCEABLE.

AS THE GROUNDWATER EXTRACTION AND TREATMENT SYSTEM IS THE SAME AS ALTERNATIVE 1B, IT WILL MEET FEDERAL AND STATE ARARS AND IT USES TREATMENT AS A PRINCIPAL ELEMENT AND REDUCES MOBILITY, TOXICITY AND VOLUME OF CONTAMINANTS.

ALTHOUGH ALTERNATIVE 5 PROVIDES SOME PUBLIC HEALTH AND ENVIRONMENTAL PROTECTION, IT IS NOT A PERMANENT REMEDY THAT REDUCES THE MOBILITY, TOXICITY AND VOLUME. HAZARDOUS SUBSTANCES IN THE SOIL REMAIN IN PLACE AND WILL REQUIRE LONG-TERM MAINTENANCE. THE CAPITAL COST OF THIS ALTERNATIVE IS \$2,113,000, THE ANNUAL O&M COST IS \$99,200, AND THE PRESENT WORTH COST IS \$3,049,000.

ALTERNATIVE 6

ALTERNATIVE 6, NO ACTION, IS INEFFECTIVE IN PREVENTING FURTHER CONTAMINANT MIGRATION AND DOES NOT MITIGATE OR REDUCE THE EXISTING CONTAMINATION AT THE SITE. IT IS NOT PROTECTIVE OF PUBLIC HEALTH AND THE ENVIRONMENT. IT WILL NOT MEET FEDERAL AND STATE ARARS NOR WILL IT REDUCE THE MOBILITY, TOXICITY OR VOLUME OF HAZARDOUS SUBSTANCES IN THE SOIL OR GROUNDWATER. HAZARDOUS SUBSTANCES IN SOIL AND GROUNDWATER WILL CONTINUE TO MIGRATE AND WILL CAUSE ADDITIONAL PUBLIC HEALTH AND ENVIRONMENTAL THREATS. THE ALTERNATIVE IS NOT A PERMANENT REMEDY. THE RISKS THAT WERE OUTLINED IN THE PUBLIC HEALTH EVALUATION REMAIN.

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RECOMMENDED REMEDY

THE RECOMMENDED REMEDY FOR SELECTION AND IMPLEMENTATION IS ALTERNATIVE 1A. ALTERNATIVES 3A, 3B, 4, 5 AND 6 CLEARLY DO NOT MEET THE PREFERENCES MANDATED BY SARA SINCE THEY DO NOT USE TREATMENT AS A PRINCIPAL ELEMENT OF THE REMEDY. ALTERNATIVE 6 LEAVES THE SITE UNCHANGED, WHICH IS UNACCEPTABLE FROM A PUBLIC HEALTH STANDPOINT. IT WILL NOT MEET FEDERAL OR STATE ARARS. ALTERNATIVES 3A, 3B, 4 AND 5 MERELY CONTAIN THE WASTE TO VARYING DEGREES WITHOUT TREATMENT. THIS IS COUNTER TO THE PREFERENCES ESTABLISHED IN SECTION 121(B) OF SARA FOR IMPLEMENTATION OF REMEDIAL ACTION. ALTERNATIVES 1A, 1B, 2A AND 2B ALL USE TREATMENT AS THE PRINCIPAL ELEMENT OF THE REMEDY. HOWEVER, ALTERNATIVES 1B AND 2B DO NOT PROVIDE TREATMENT OF THE SOILS WHICH CAN POTENTIALLY AND SIGNIFICANTLY CONTRIBUTE TO GROUNDWATER CONTAMINATION SHOULD THE REMEDIAL ACTION FAIL. BOTH ALTERNATIVES REQUIRE LONG-TERM MAINTENANCE OF THE RCRA CAP TO MAINTAIN THE EFFECTIVENESS OF THE REMEDY. THESE ALTERNATIVES ARE CONTAINMENT IN SUBSURFACE SOIL BELOW TWO FEET REMAIN AT THE SITE WITHOUT TREATMENT. THE MOBILE CONTAMINANTS IN SUBSURFACE SOIL BELOW TWO FEET REMAIN AT THE SITE WITHOUT TREATMENT. SINCE THE CONTAMINATION THAT CAN LEACH INTO THE GROUNDWATER REMAINS AT THE SITE, THE POTENTIAL FOR ADDITIONAL FUTURE REMEDIAL ACTION REMAINS. THE LONG-TERM PROTECTIVENESS AND PERMANENCE OF THESE ALTERNATIVES ARE LESS THAN FOR ALTERNATIVES 1A AND 2A. THEREFORE, ALTERNATIVES 1B AND 2B ARE NOT RECOMMENDED FOR IMPLEMENTATION AT THE PRISTINE, INC. SITE.

ALTERNATIVE 1A AND 2A WILL REDUCE THE MOBILITY, TOXICITY AND VOLUME OF THE CONTAMINATED MEDIA. THE ALTERNATIVES WILL MEET IDENTIFIED FEDERAL AND STATE ARARS. BOTH ALTERNATIVES ARE FULLY PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. EACH WILL REQUIRE SPECIALIZED EQUIPMENT AND OPERATORS, AND WILL REQUIRE SIMILAR MAINTENANCE EFFORT. BOTH ARE TECHNICALLY FEASIBLE AND IMPLEMENTABLE. HOWEVER, VITRIFICATION IS THE LOWER COST ALTERNATIVE. THEREFORE, INCINERATION IS NOT RECOMMENDED FOR IMPLEMENTATION AT THE PRISTINE, INC. SITE.

THE OHIO EPA SUPPORTS THE SELECTION OF ALTERNATIVE 1A FOR THE PRISTINE, INC. SITE. THEY WOULD SUPPORT ONLY THE GROUNDWATER REMEDIAL ACTION IF ANOTHER ALTERNATIVE IS IMPLEMENTED. THEIR ONLY RESERVATION INVOLVES U.S. EPA'S INTERPRETATION OF SARA SECTION 121, GROUNDWATER CLEANUP LEVELS, AND HOW DIOXIN WILL BE ADDRESSED. THESE MATTERS ARE DISCUSSED IN DETAIL IN THE RESPONSIVENESS SUMMARY.

ALTERNATIVE 1A IS A PERMANENT REMEDY REQUIRING NO MAINTENANCE OF THE VITRIFIED MASS TO MAINTAIN EFFECTIVENESS, AND LITTLE OVERALL MAINTENANCE. ALTERNATIVE 1A IS FULLY PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, REDUCES MOBILITY, TOXICITY, AND VOLUME OF HAZARDOUS SUBSTANCES AT THE PRISTINE, INC. SITE THROUGH TREATMENT, AND IS A COST EFFECTIVE ALTERNATIVE. THEREFORE, ALTERNATIVE 1A IS THE RECOMMENDED ALTERNATIVE FOR THE PRISTINE, INC. SITE. FIGURE 9 IS A DEPICTION OF THE ISV PROCESS.

THE COMMUNITY AND PRPS ARE GENERALLY IN AGREEMENT WITH THE GROUNDWATER EXTRACTION AND TREATMENT COMPONENT OF THE ALTERNATIVE.

THERE IS COMMUNITY CONCERN OVER THE SHORT-TERM EFFECTS OF THE ALTERNATIVE. SOME MEMBERS OF THE COMMUNITY HAVE FULLY SUPPORTED U.S. EPA'S RECOMMENDED ALTERNATIVE, WHILE THE PRPS REJECTED VITRIFICATION AND HAVE PROPOSED INSTALLATION OF A RCRA CAP WITH SOIL GAS VENTING. THE CITY OF READING PREFERS THAT U.S. EPA FUND A LESS EXPENSIVE REMEDIAL ACTION AND GIVE IT THE REMAINING FUNDS TO BUILD A NEW TREATMENT PLANT. THESE CONCERNS ARE ADDRESSED IN THE RESPONSIVENESS SUMMARY.

ALTERNATIVE 1A PROVIDES A HIGH DEGREE OF TREATMENT OF THE HAZARDOUS SUBSTANCES PRESENT AT THE SITE. IT WILL BE BOTH A SOURCE CONTROL (THROUGH REMEDIATION OF SOIL) AND A MANAGEMENT OF MIGRATION REMEDY (THROUGH GROUNDWATER REMEDIATION). THEREFORE, THE ALTERNATIVE WILL ELIMINATE THE THREAT OF DIRECT CONTACT WITH HAZARDOUS SUBSTANCES, AND THE FUTURE THREAT OF LEACHATE PRODUCTION FROM THE CONTAMINATED SOIL/RESIDUALS. THE GROUNDWATER PLUME AT THE SITE HAS NOT BEEN FULLY CHARACTERIZED IN THE LOWER AQUIFER. ALTHOUGH CONTAMINATED GROUNDWATER BENEATH THE SITE WILL BE EXTRACTED (LOWER OUTWASH LENS AND UPPER 25 FEET OF LOWER AQUIFER) TO CONTROL FURTHER CONTAMINANT MIGRATION, THE EXTENT OF CONTAMINATION IN THE LOWER AQUIFER DUE TO THE PRISTINE, INC. SITE IS NOT KNOWN. THERE IS A POTENTIAL MULTI-SOURCE GROUNDWATER CONTAMINATION PROBLEM IN THE VICINITY OF THE SITE. THE EXTENT OF CONTAMINATION FROM PRISTINE, INC. WILL BE DETERMINED BY ADDITIONAL STUDIES DURING THE REMEDIAL DESIGN. THIS REMEDIAL ACTION, HOWEVER, IS CONSIDERED THE FINAL SOURCE CONTROL REMEDIAL ACTION AT THE SITE.

HAZARDOUS SUBSTANCES IN THE SOIL WILL BE VITRIFIED TO PERMANENTLY AND SIGNIFICANTLY REDUCE THEIR TOXICITY, MOBILITY AND VOLUME. THE ORGANIC COMPOUNDS WILL BE DESTROYED AND THE INORGANIC COMPOUNDS WILL BE PERMANENTLY ENCAPSULATED.

BECAUSE THIS IS NOT A PROVEN TECHNOLOGY, PRIOR TO IMPLEMENTATION OF THIS REMEDIAL ACTION, BENCH AND/OR ENGINEERING PILOT SCALE STUDIES WILL BE REQUIRED TO CONFIRM THE EFFECTIVENESS AND APPLICABILITY OF THIS TECHNOLOGY TO SITE CONDITIONS. BECAUSE OF CONCERN OVER THE EFFECTIVENESS OF VITRIFYING THE UPPER OUTWASH LENS, CONSIDERATION WILL BE GIVEN, DURING THESE BENCH AND/OR PILOT STUDIES, TO WHETHER THE LENS SHOULD BE DRAINED PRIOR TO VITRIFICATION. A COMPREHENSIVE PROGRAM OF TESTING AND ANALYSIS ON THE VITRIFIED MATERIAL WILL BE CONDUCTED AFTER THE MATERIAL COOLS COMPLETELY (COOLING IS EXPECTED TO TAKE THREE TO FIVEMONTHS). THE TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) IS THE TESTING MECHANISM THAT SHOULD BE USED TO VERIFY THE COMPLETE TREATMENT. IF THIS TREATMENT METHOD IS FOUND TO BE INEFFECTIVE, THIS RECORD OF DECISION MAY NEED TO BE REOPENED.

MONITORING WILL BE CONDUCTED DURING THE TREATMENT PROCESS TO DETERMINE IF CONTAMINATION IS MIGRATING THROUGH THE SOIL AS A RESULT OF THE TREATMENT.

#OEL

CONSISTENCY WITH OTHER LAWS

ALTERNATIVE 1A IS DESIGNED TO MEET ALL APPLICABLE, OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) OF FEDERAL AND STATE STATUTES. THE FEDERAL ARARS INCLUDE RCRA (40 CFR PART 260-271), OSHA (29 CFR PART 1910) THE SAFE DRINKING WATER ACT (40 CFR SECTION 141.11 AND .12), AND THE CLEAN WATER ACT (40 CFR PARTS 122, 125 AND 131). STATE ARARS INCLUDE THE OHIO REVISED CODE (ORC) CHAPTERS 3704, 3734, 3745, 6109 AND 6111. RULES FOR IMPLEMENTATION OF THESE REQUIREMENTS ARE CONTAINED THE OHIO ADMINISTRATIVE CODE (OAC) 3745.

THE FOLLOWING SPECIFIC ARARS WILL BE MET BY ALTERNATIVE 1A.

GROUNDWATER

THREE GROUPS OF FEDERAL STANDARDS AND CRITERIA ARE CONSIDERED TO BE ARARS FOR GROUNDWATER AT THE PRISTINE, INC. SITE; MCLS, RCRA GROUNDWATER PROTECTION STANDARDS, AND WATER QUALITY CRITERIA.

MCLS - MAXIMUM CONTAMINANT LEVELS ESTABLISHED UNDER THE SAFE DRINKING WATER ACT. THESE ARE THE MAXIMUM CONTAMINANT CONCENTRATIONS ALLOWED IN REGULATED PUBLIC WATER SUPPLIES. THESE LEVELS APPLY AT THE TAP TO PUBLIC WATER SYSTEMS HAVING AT LEAST 15 SERVICE CONNECTIONS OR REGULARLY SERVING AT LEAST 25 INDIVIDUALS. LEVELS ARE BASED ON A CHEMICAL'S TOXICITY, TREATABILITY (INCLUDING COST CONSIDERATION), AND ANALYTICAL LIMITS OF DETECTION. MCLS ARE ARARS SINCE THE LOWER AQUIFER IS PRESENTLY BEING USED FOR DRINKING WATER AND MCLS ARE THE ENFORCEABLE DRINKING WATER STANDARD FOR PUBLIC WATER SUPPLIES. SINCE MCLS APPLY TO WATER AT ITS POINT OF DISTRIBUTION ("AT THE TAP"), THESE LEVELS ARE APPROPRIATE FOR GROUNDWATER AT THIS SITE BECAUSE WELLS THAT USE THE AQUIFER NOW, OR RESIDENTIAL WELLS IN THE FUTURE, GENERALLY HAVE MINIMAL OR NO TREATMENT. THUS, THESE STANDARDS WILL HAVE TO BE APPLIED IN THE GROUNDWATER ITSELF TO ENSURE SAFE LEVELS AT THE TAP.

SAFE DRINKING WATER ACT (SDWA) - NATIONAL PRIMARY AND SECONDARY DRINKING WATER REGULATIONS ESTABLISHED UNDER 40 CFR SECTION 141.11 AND 141.12 INCLUDE MCLS WHICH ARE ARARS FOR THE PRISTINE, INC. SITE.

RCRA GROUNDWATER PROTECTION STANDARDS - RCRA GROUNDWATER PROTECTION STANDARDS ESTABLISHED UNDER 40 CFR SECTION 264.94 INCLUDE BACKGROUND CONCENTRATIONS, TABLE 1 VALUES, AND ALTERNATE CONCENTRATION LIMITS (ACLS). THESE STANDARDS ARE SPECIFIED IN PERMITS ISSUED TO HAZARDOUS WASTE MANAGEMENT FACILITIES PURSUANT TO RCRA. PRISTINE, INC. HAD INTERIM STATUS UNDER RCRA. THEREFORE, THESE STANDARDS ARE ARARS. THE FOLLOWING IS A DISCUSSION OF THESE STANDARDS.

1. TABLE 1 VALUES - 40 CFR SECTION 264.94(A)(2) LISTS MAXIMUM CONCENTRATION LIMITS (MCLS) FOR FOURTEEN COMPOUNDS. THREE CONTAMINANTS AT THE PRISTINE, INC. SITE EXCEED THESE LISTED VALUES: ARSENIC, BARIUM, AND LEAD. THE LEVELS ARE 50 UG/L FOR LEAD, 50 UG/L FOR ARSENIC, AND 1,000 UG/L FOR BARIUM. THESE LEVELS ARE BASED ON THE SAFE DRINKING WATER ACT MCL, WHICH IS SET AT A LEVEL PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT.

2. ALTERNATE CONCENTRATION LIMITS (ACLS) - EPA MAY ESTABLISH ACLS IN LIEU OF BACKGROUND LEVELS OR LISTED TABLE 1 VALUES IF THE ACL "WILL NOT POSE A SUBSTANTIAL PRESENT OR POTENTIAL HAZARD TO HUMAN HEALTH OR THE ENVIRONMENT AS LONG AS THE ACL IS NOT EXCEEDED.". 40 CFR (264.94(B)).

SECTION 121(D)(2)(B)(II) OF CERCLA RESTRICTS THE USE OF ACLS AS CLEANUP STANDARDS FOR ON-SITE CLEANUPS THAT ASSUME A POINT OF HUMAN EXPOSURE BEYOND THE FACILITY'S BOUNDARY. THE SELECTED REMEDY FOR THE PRISTINE, INC. SITE DOES NOT ASSUME A POINT OF HUMAN EXPOSURE TO CONTAMINANTS EXCEEDING ACLS BEYOND THE FACILITY BOUNDARY; RATHER, THE POINT OF HUMAN EXPOSURE INCLUDES THE ENTIRE GROUNDWATER PLUME AT, AND MIGRATING FROM, THE FACILITY. THEREFORE, THE RESTRICTION GIVEN AT SECTION 121(D)(2)(B)(II) DOES NOT APPLY AT THIS SITE. ACLS MAY BE USED TO ESTABLISH GROUNDWATER CLEANUP LEVELS FOR THE PRISTINE, INC. SITE EXCEPT FOR THOSE CONTAMINANTS LISTED IN TABLE 1.

WHEN THE OVERALL HEALTH BASED CLEANUP STANDARD OF 1×10^{-6} CUMULATIVE EXCESS CANCER RISK AT THE PLUME BOUNDARY IS MET, BY DEFINITION THE CONCENTRATIONS OF THE INDIVIDUAL CONTAMINANTS IN THE GROUNDWATER WILL NOT PRESENT A THREAT TO HUMAN HEALTH AND ENVIRONMENT. THOSE SAFE, RESIDUAL CONCENTRATIONS WHICH RESULT IN AN OVERALL HEALTH BASED CLEANUP LEVEL OF 1×10^{-6} CUMULATIVE EXCESS CANCER RISK AT THE SITE BOUNDARY WILL BE THE ACLS.

3. BACKGROUND LEVELS - RCRA GROUNDWATER PROTECTION REGULATIONS REQUIRE THAT THE CONCENTRATION OF A HAZARDOUS CONSTITUENT MUST NOT EXCEED BACKGROUND OR THE LISTED MAXIMUM CONCENTRATION LIMIT OR THE ACL. THE LISTED TABLE 1 VALUES FOR BARIUM, LEAD AND ARSENIC MUST BE MET AT THE SITE. ACLS FOR OTHER CONTAMINANTS WILL BE HEALTH BASED LEVELS. BACKGROUND LEVELS ARE ARARS WHEN THE CONCENTRATIONS OF CONTAMINANTS IN THE BACKGROUND EXCEED TABLE 1 VALUES, ACLS OR WHEN THE CONSTITUENT HAS NO HEALTH-BASED LEVEL.

WATER QUALITY CRITERIA (WQC) ESTABLISHED UNDER THE CLEAN WATER ACT

ALTHOUGH THE CLEAN WATER ACT (CWA) IS NOT LEGALLY "APPLICABLE" TO THE GROUNDWATER CLEANUP AT THE SITE, IT IS RELEVANT AND APPROPRIATE. SECTION 121(D)(2)(A)(II) STATES THAT REMEDIAL ACTIONS SHALL ATTAIN WATER QUALITY CRITERIA ESTABLISHED UNDER SECTION 304 OR 303 OF THE CWA, WHERE SUCH GOALS OR CRITERIA ARE RELEVANT AND APPROPRIATE UNDER THE CIRCUMSTANCES OF THE RELEASE OR THREATENED RELEASE.

THE AQUIFERS BENEATH THE SITE ARE CURRENT AND POTENTIAL SOURCES OF DRINKING WATER. THEREFORE, WQC THAT HAVE BEEN ADAPTED FOR DRINKING WATER ONLY ARE ARARS FOR THE GROUNDWATER CLEANUP FOR THE SITE.

SOIL

THE CONTAMINATED SOIL IN THE MAGIC PIT AREA AND THE SEDIMENTS WILL BE CONSOLIDATED ONSITE. THIS ALTERNATIVE DOES NOT INVOLVE PLACEMENT OF SOIL. THE TREATMENT METHOD WILL BE CARRIED OUT "IN SITU". THEREFORE, 40 CFR PART 268, THE LAND DISPOSAL RESTRICTION (LDR) DOES NOT APPLY. SUBPART D, TREATMENT STANDARDS, WILL BE CONSIDERED. THE RELEVANT AND APPROPRIATE REQUIREMENTS OF RCRA SUBTITLE C (CLEAN CLOSURE AND LANDFILL CLOSURE) REGULATIONS WILL BE MET BY THE SELECTED REMEDY. THE SELECTED REMEDY INVOLVES IN-SITU TREATMENT OF CONTAMINATED SOIL AND SEDIMENT AND GROUNDWATER EXTRACTION AND TREATMENT AT THE SITE. SINCE IN-SITU TREATMENT WILL OCCUR ENTIRELY WITHIN THE AREA OF CONTAMINATION, DISPOSAL WILL NOT OCCUR AS PART OF THE SELECTED REMEDY. THUS, RCRA CLOSURE REQUIREMENTS FOR CLEAN CLOSURE AND LANDFILL CLOSURE ARE RELEVANT AND APPROPRIATE. THIS ALLOWS IMPLEMENTATION OF CLOSURE THAT MEETS THE RELEVANT AND APPROPRIATE REQUIREMENTS OF RCRA CLEAN

CLOSURE/LANDFILL CLOSURE.

A DEMONSTRATION, INVOLVING GROUNDWATER OR VADOSE ZONE MONITORING, WILL BE MADE TO ENSURE THAT THE TREATED MATERIAL AND UNTREATED RESIDUALS WILL NOT MIGRATE TO THE GROUNDWATER AQUIFER. A SOIL/VEGETATIVE COVER WILL BE PLACED OVER THE SURFACE OF THE SITE TO ADDRESS ANY POTENTIAL DIRECT CONTACT THREAT. IF THE TREATMENT METHOD IS EFFECTIVE TO THE POINT THAT THE MATERIAL LEFT IN PLACE MEETS THE CRITERIA FOR DELISTING OR THE STANDARDS FOR RISK-BASED CLOSURE, NO RCRA-TYPE CAP IS REQUIRED. HOWEVER, IF SAMPLING DEMONSTRATES THAT THESE CRITERIA ARE NOT MET, A RCRA-TYPE CAP MAY BE REQUIRED. IT IS ASSUMED AT THIS TIME THAT NO RCRA-TYPE CAP WILL BE REQUIRED.

OTHER

- PART 264.90-101. COMPLIANCE MONITORING AND CORRECTIVE ACTION WILL BE FOLLOWED SINCE HAZARDOUS WASTE HAS BEEN RELEASED FROM THE SITE. GROUNDWATER COLLECTION AND TREATMENT WILL OCCUR ONSITE PRIOR TO DISCHARGE. MCLS AND ACLS WILL BE USED AS MINIMUM GROUNDWATER QUALITY REQUIREMENTS, EXCEPT IF BACKGROUND LEVELS EXCEED THESE OTHER VALUES OR NO HEALTH BASED ACLS, MCLS OR OTHER ARARS EXIST.

- PART 264.114 - ALL CONTAMINATED EQUIPMENT, SOILS AND STRUCTURES MUST BE PROPERLY DISPOSED OF OR DECONTAMINATED. THIS WOULD INCLUDE EXCAVATION EQUIPMENT, SAMPLING EQUIPMENT, AND TANKS.

- PART 264.116 - A SURVEY PLAT INDICATING THE LOCATION AND DIMENSIONS OF THE HAZARDOUS WASTE CLOSURE AREA WILL BE SUBMITTED TO THE LOCAL ZONING AUTHORITY, OR THE AUTHORITY WITH JURISDICTION OVER LAND USE. THE PLAT WILL ALSO BE SUBMITTED TO THE U.S. EPA REGIONAL ADMINISTRATOR AND THE DIRECTOR OF THE OHIO EPA.

- PART 264.14 AND 264.117(B) AND (C) - A 24-HOUR SURVEILLANCE OF THE SITE WILL BE MAINTAINED DURING CLOSURE ACTIVITIES TO PREVENT UNAUTHORIZED ACCESS. THE USE OF THE FACILITY AREA MUST BE RESTRICTED SO THAT THE MONITORING SYSTEM IS NOT DISTURBED.

- RCRA SUBCHAPTER III, 42 U.S.C. 6921-6939B PROVIDES THAT U.S. EPA MAY REQUIRE CORRECTIVE ACTION NECESSARY TO PROTECT HUMAN HEALTH OR THE ENVIRONMENT WHENEVER U.S. EPA DETERMINES THERE HAS BEEN A RELEASE OF HAZARDOUS WASTE FROM A HAZARDOUS WASTE MANAGEMENT FACILITY.

HEALTH AND SAFETY

- THE REMEDIAL ACTION CONTRACTOR MUST DEVELOP AND IMPLEMENT A HEALTH AND SAFETY PROGRAM FOR HIS WORKERS. ALL ONSITE WORKERS MUST MEET THE MINIMUM TRAINING AND MEDICAL MONITORING REQUIREMENTS OUTLINED IN 40 CFR 1980.

SURFACE WATER

- THE TREATED GROUNDWATER DISCHARGED TO THE MILL CREEK WILL MEET THE TECHNICAL REQUIREMENTS OF SECTION 402 OF THE CWA, THE NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) REQUIREMENTS. SPECIFIC CHEMICAL DISCHARGE LIMITS WILL BE DEVELOPED FOR THE GROUNDWATER TREATMENT SYSTEM THAT WILL ENSURE PROTECTION OF WATER QUALITY AND AQUATIC LIFE IN THE MILL CREEK. MILL CREEK IS CLASSIFIED AS A LIMITED WARMWATER HABITAT.

THE RANGE OF INORGANIC CONTAMINANTS FOUND IN THE GROUNDWATER AND SURFACE WATER EXCEEDS FEDERAL ACUTE AND/OR CHRONIC WATER QUALITY CRITERIA (E.G., CADMIUM, COPPER, LEAD, MERCURY, AND ZINC). OHIO WATER QUALITY STANDARDS ARE ALSO EXCEEDED (E.G., CADMIUM, FLUORIDE, LEAD AND MERCURY). OHIO EPA WILL DETERMINE LIMITS ON ALL PARAMETERS FOR EFFLUENT DISCHARGES FROM THE TREATMENT FACILITY BASED ON MILL CREEK'S DESIGNATED USE AND THE APPROPRIATE STATE STANDARDS. SOME FURTHER TREATMENT PRIOR TO OR AFTER THE AIR STRIPPER MAY BE REQUIRED. A BENCH SCALE STUDY WILL BE CONDUCTED TO DETERMINE THE NEED FOR METALS TREATMENT.

AIR

- THERE ARE NO ARARS DIRECTLY DERIVED FROM THE CLEAN AIR ACT (CAA). HOWEVER, THE RISK FROM INHALATION OF CONTAMINANTS FROM EITHER THE PRESENT SITE CONDITIONS OR AS A RESULT OF REMEDIAL ACTION LEADS U.S. EPA TO TAKE MITIGATIVE ACTION I.E., ADD GRANULAR ACTIVATED CARBON TO THE AIR STREAM, SAMPLE FOR RADON GAS OR ITS DECAY

PRODUCTS AND TREAT THE VITRIFIED OFF-GASES.

NATURALLY OCCURRING AND ACCELERATOR PRODUCED RADIOACTIVE MATERIALS (NARM) ARE NOT COVERED BY THE NUCLEAR REGULATORY COMMISSION BUT BY STATE AGENCIES. THE OHIO DEPARTMENT OF HEALTH HAS JURISDICTION IN THIS CASE.

OHIO REVISED CODE

ORC CHAPTER 3734 PROVIDES STATUTORY AUTHORITY FOR THE REGULATIONS OF SOLID AND HAZARDOUS WASTE ACTIVITIES IN THE STATE OF OHIO. AS SUCH, THIS CHAPTER AS A WHOLE CAN BE APPLIED TO ANY REMEDIAL ACTION AS A STATE ARAR.

THE OHIO EPA HAZARDOUS WASTE REGULATIONS DEVELOPED ON THE BASIS OF CHAPTER 3734 OF THE ORC CAN BE FOUND IN SECTION 3745-50 TO 3745-69 OF THE OHIO ADMINISTRATIVE CODE. THESE REGULATIONS CLOSELY TRACK U.S. EPA HAZARDOUS WASTE REGULATION WITH FEW EXCEPTIONS.

ORC CHAPTER 3704 ESTABLISHES OHIO EPA'S AUTHORITY TO REGULATE AND CONTROL AIR POLLUTION WITHIN THE STATE OF OHIO. THE RULES DEVELOPED AND PROMULGATED BY OHIO EPA TO IMPLEMENT THE AUTHORITIES GRANTED THROUGH THIS LAW CAN BE FOUND IN SECTIONS 3745-15 TO 3745-25 OF THE OHIO ADMINISTRATIVE CODE.

ORC CHAPTER 6111 ESTABLISHES OHIO EPA'S AUTHORITY TO SET WATER QUALITY STANDARDS (SECTION 611.04) AND REGULATE WATER POLLUTION SOURCES. THE RULES DEVELOPED AND IMPLEMENTED BY OHIO EPA BASED ON CHAPTER 6111 ORC ARE CONTAINED IN OAC SECTION 3745-1 THROUGH 3745-13.

ORC CHAPTER 6109 ESTABLISHES OHIO EPA'S AUTHORITY TO REGULATE PUBLIC WATER SUPPLIES. THE RULES DEVELOPED AND IMPLEMENTED BY OHIO EPA BASED ON CHAPTER 6109 ARE CONTAINED IN OAC SECTIONS 3746-81 TO 3745-99.

THE ALTERNATIVE WILL MEET THE TECHNICAL REQUIREMENTS OF ORC CHAPTER 3734 SINCE THESE REGULATIONS ARE ESSENTIALLY THE SAME AS RCRA WITH THE EXCEPTION OF 3734.02(H), .05(C)(6), AND 3745.53.11.

THE AIR STRIPPER WILL MEET THE REQUIREMENTS OF ORC CHAPTER 3704. THE VITRIFICATION OFF-GASES WILL ALSO MEET THESE REQUIREMENTS.

THE STATE OF OHIO, AS AN AUTHORIZED STATE, MANAGES THE NPDES PROGRAM PURSUANT TO THE CWA. THE TECHNICAL REQUIREMENTS OF THE STATE NPDES PROGRAM WILL BE FOLLOWED.

ALL STATE ARARS WILL BE MET THROUGH THE IMPLEMENTATION OF ALTERNATIVE 1A.

TABLE 9 SHOWS THE CLEANUP LEVELS THAT WILL BE MET. (THE 10-6 VALUES ARE NOT LISTED BUT MAY BE USED TO DEVELOP THE ACLS.). A CUMULATIVE LIST OF ARARS IS CONTAINED IN CHAPTER 5 OF THE FS.

SUMMARY DISCUSSION

CONSIDERING THE VARIOUS EVALUATION FACTORS FOUND IN SARA SECTION 121(B)(1) AND THE NATIONAL CONTINGENCY PLAN, ALTERNATIVE 1A OFFERS A COST-EFFECTIVE SOLUTION TO THE CONTAMINATION PROBLEM AT THE SITE. THE PRINCIPAL THREATS POSED BY THE SITE ARE DIRECT CONTACT WITH ON AND OFF-SITE SOILS AND INGESTION OF GROUNDWATER. IN ORDER TO REMEDY THESE THREATS, ALTERNATIVE 1A USES TREATMENT AS A PRINCIPAL ELEMENT TO THE MAXIMUM EXTENT PRACTICABLE. IT REDUCES THE MOBILITY, TOXICITY AND VOLUME OF CONTAMINANTS. IN-SITU VITRIFICATION OF SOILS WILL ELIMINATE THE POSSIBILITY FOR CONTAMINANTS TO LEACH INTO GROUNDWATER. GROUNDWATER CONTAMINANTS (BOTH ON- AND OFF-SITE) WILL BE REMOVED AND TREATED. THIS ALTERNATIVE PROVIDES EQUAL PROTECTION AS ALTERNATIVE 2A AND IS APPROXIMATELY TWO TIMES LESS EXPENSIVE. THE COST IS COMPARABLE TO OFF-SITE DISPOSAL COSTS.

BASED ON THE ABOVE ANALYSIS AND THE EARLIER DISCUSSIONS, THE RECOMMENDED ALTERNATIVE IS FULLY PROTECTIVE OF PUBLIC HEALTH AND THE ENVIRONMENT, COST-EFFECTIVE, UTILIZES TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE, AND WILL ATTAIN ALL APPLICABLE, OR RELEVANT AND APPROPRIATE FEDERAL AND STATE REQUIREMENTS. ACCORDING TO SECTION 121(B)(2), AND ALTERNATIVE REMEDIAL ACTION MAY BE SELECTED WHETHER OR NOT SUCH ACTION HAS BEEN ACHIEVED IN PRACTICE AT ANY OTHER FACILITY OR SITE THAT HAS SIMILAR CHARACTERISTICS. THE PRESENT WORTH COST OF ALTERNATIVE 1A IS \$21,731,000 AND THE ANNUAL O&M COST IS \$94,800.

#OM

OPERATION AND MAINTENANCE

THE RECOMMENDED ALTERNATIVE REQUIRES SOME ANNUAL OPERATION AND MAINTENANCE (O&M) ACTIVITY TO ENSURE THAT GROUNDWATER WILL BE EXTRACTED AND TREATED TO MEET ARARS. AFTER THE IN-SITU SOIL VITRIFICATION IS COMPLETED, THE TREATMENT FACILITY BUILT, AND THE EXTRACTION SYSTEM CONSTRUCTED, SEVERAL O&M ACTIVITIES MUST BE PERFORMED. UNSATURATED ZONE MONITORING MUST BE CONDUCTED TO DETERMINE WHETHER HAZARDOUS CONSTITUENTS MIGRATE OUT OF THE TREATMENT ZONE. THE VEGETATIVE COVER MUST BE MAINTAINED AND BE CAPABLE OF MAINTAINING GROWTH WITHOUT EXTENSIVE MAINTENANCE. A RUN-ON AND RUN-OFF CONTROL SYSTEM MUST BE MAINTAINED. ONSITE GROUNDWATER EXTRACTION AND TREATMENT WILL BE REQUIRED FOR AT LEAST FIVE YEARS OR UNTIL CLEANUP LEVELS ARE MET IN THE GROUNDWATER UNDER, AND MIGRATING FROM, THE SITE. THE GROUNDWATER WILL BE MONITORED. A FENCE AROUND THE SITE MUST BE MAINTAINED.

#SCH

SCHEDULE

THIS REMEDIAL ACTION START IS ONE OF THE 175 SITES COMPRISING A STATUTORY GOAL FOR REMEDIAL ACTION STARTS BY OCTOBER 1989. THE FOLLOWING ARE THE KEY MILESTONES FOR IMPLEMENTATION OF THE REMEDIAL ACTION IN THE EVENT THAT RD/RA NEGOTIATIONS ARE NOT SUCCESSFUL.

MILESTONE	DATE
APPROVE REMEDIAL ACTION (SIGN ROD)	DECEMBER 1987
INITIATE REMEDIAL DESIGN/PILOT STUDIES	APRIL 1988
COMPLETE REMEDIAL DESIGN	JUNE 1989
INITIATE REMEDIAL ACTION (AWARD CONTRACT)	AUGUST 1989
COMPLETE REMEDIAL ACTION	AUGUST 1991.

#FA

FUTURE ACTIONS

ADDITIONAL STUDIES WILL BE CONDUCTED TO DETERMINE THE EXTENT OF THE CONTAMINANT PLUME IN THE LOWER AQUIFER FROM THE PRISTINE, INC. SITE. IT IS SUSPECTED THAT THERE IS A MULTI SOURCE GROUNDWATER CONTAMINATION PROBLEM IN THE AREA. BECAUSE THE PROBLEM IS WIDESPREAD, IT MAY BE ADDRESSED UNDER ADDITIONAL MECHANISMS SUCH AS NEW NPL LISTINGS, RCRA CORRECTIVE ACTION, OR PRELIMINARY ASSESSMENT/SITE INSPECTION (PA/SI) ACTIVITY.

THE EXTENT OF REMEDIATION OF THE CONTAMINATED SOIL NECESSARY TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT HAS BEEN DEFINED BASED ON ACTUAL ANALYTICAL RESULTS OBTAINED DURING THE RI AND RI-2, AND ON MODELING CONDUCTED AS PART OF THE FS. IN ORDER TO ASSURE THAT AN ADEQUATE CLEANUP WILL BE DONE AT THE SITE, CONFIRMATIONAL TESTING WILL BE DONE ON THE SOIL WHICH IS VITRIFIED AS PART OF THE BENCH AND/OR PILOT SCALE STUDIES.

ADDITIONALLY, LEACHATE TESTS MAY BE CONDUCTED TO CONFIRM THE EXPECTED LEACHATE PRODUCTION CAPACITY OF THE CONTAMINATED SOILS. THIS MAY BE DONE IN ORDER TO CONFIRM THESE CLEANUP LEVELS BASED ON LEACHATE PRODUCTION WHICH WERE DEFINED IN THE FS, AND THE RESULTING VOLUME OF SOIL THAT NEEDS TO BE VITRIFIED TO MEET THESE CLEANUP LEVELS.

#TMA

TABLES, MEMORANDA, ATTACHMENTS

TABLE 4

POTENTIAL CARCINOGEN	EXPOSURE POINT	INCREMENTAL LIFETIME CANCER RISK	
		MOST PROBABLE CASE	WORST CASE
BENZO(A)PYRENE	SOILS; CURRENT	1.6 X 10 ⁻⁸	1.4 X 10 ⁻⁶
DIELDRIN	USE: INCIDENTAL	1.5 X 10 ⁻⁶	3.1 X 10 ⁻⁴
TOTAL	INGESTION	1.5 X 10 ⁻⁶	3.1 X 10 ⁻⁴
BENZENE	GROUNDWATER;	3.7 X 10 ⁻⁶	6.2 X 10 ⁻³
VINYL CHLORIDE	CURRENT USE;	1.1 X 10 ⁻⁴	6.7 X 10 ⁻³
TETRACHLOROETHENE	INCIDENTAL	2.2 X 10 ⁻⁷	5.9 X 10 ⁻⁵
TOTAL	INGESTION *	1.1 X 10 ⁻⁴	1.3 X 10 ⁻²
BENZENE	GROUNDWATER;	3.1 X 10 ⁻⁵	5.0 X 10 ⁻²
VINYL CHLORIDE	POTENTIAL FUTURE	9.2 X 10 ⁻⁴	5.4 X 10 ⁻²
TETRACHLOROETHENE	USE; INCIDENTAL	1.9 X 10 ⁻⁶	5.0 X 10 ⁻⁴
TOTAL	INGESTION **	9.5 X 10 ⁻⁴	1.0 X 10 ⁻¹
BENZO(A)PYRENE	SURFACE WATER AND	4.2 X 10 ⁻¹⁸	1.4 X 10 ⁻¹⁷
BENZENE	SOIL; CURRENT USE;	1.3 X 10 ⁻⁹	1.1 X 10 ⁻⁷
DIELDRIN	VOLATILIZATION	3.8 X 10 ⁻¹⁶	6.4 X 10 ⁻¹⁵
TETRACHLOROETHENE	AND INHALATION	3.3 X 10 ⁻¹¹	1.3 X 10 ⁻¹¹
TOTAL		1.3 X 10 ⁻⁹	1.1 X 10 ⁻⁷

* THIS SCENARIO ASSUMES A RADIAL PERCENTAGE (12%) OF GROUNDWATER FROM THE PRISTINE SITE WILL AFFECT THE WELLFIELD USING THE CURRENT PUMPING RATES IN THE AREA

** THIS SCENARIO ASSUMES A PRIVATE WELL IS INSTALLED DIRECTLY OFFSITE.

TABLE 5

TARGET SOIL CONCENTRATIONS
PRISTINE, INC. SITE
BASED ON CUMULATIVE 10-6 INCREMENTAL LIFETIME CANCER RISK

CHEMICAL	TARGET INTAKE CONCENTRATION IN SOIL (UG/KG)
ALDRIN	15
BENZENE	3182
CHLOROFORM	2043
DDT	487
1,2-DICHLOROETHANE	1818
1,1-DICHLOROETHENE	285
DIELDRIN	6
PAHS	14
2,3,7,8-TCDD (DIOXIN)	0
TETRACHLOROETHENE	3244
TRICHLOROETHENE	15,041.

TABLE 7

TARGET SOIL CONCENTRATIONS WITH
PREDICTED GROUNDWATER CONCENTRATIONS AT MCLS

INDICATOR CHEMICAL	TARGET SOIL CONCENTRATION (UG/KG)
BENZENE	116
1,2-DICHLOROETHANE	19
TRICHLOROETHENE	175.

TABLE 9

**ARARS
(UG/L)**

CHEMICAL	CWA		
	MCL (RCRA)	MCL (SDWA)	WOC (DRINKING ONLY)
ALDRIN			0.0012
ARSENIC	50	50	
BARIUM	1000	1000	
BENZENE		5	
BENZO(A)PYRENE			0.0031
BERYLLIUM			0.0039
CADMIUM	10	10	10
CHLOROBENZENE			488
CHLOROFORM (TRIHALOMETHANES)		100	
CHROMIUM	50	50	
COPPER		1,000	1,000
DDT			0.0012
DIBUTYL PHTHALATE			
1,2-DICHLOROBENZENE		75	
1,2-DICHLOROETHANE		5	
1,1-DICHLOROETHENE		7	0.00033
DIELDRIN			0.0011
ETHYLBENZENE			2,400
FLUORIDE		4000	
HEXACHLOROETHANE			
LEAD	50	50	5,200
MERCURY	2	2	10
PENTACHLOROPHENOL			1,010
PHENOL			3,500
2,3,7,8 TCDD			(0)
TETRACHLOROETHENE			0.88
TOLUENE			15,000
1,1,1 TRICHLOROETHANE		200	
TRICHLOROETHENE		5	2.8
VINYL CHLORIDE		2.	